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HELP SEEKING IN DEVELOPMENTAL MATHEMATICS COURSES

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HELP SEEKING IN DEVELOPMENTAL MATHEMATICS COURSES

by

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Dedication

To my Daddy. I miss you.

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Help Seeking in Developmental Mathematics Courses

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Although reasons for avoiding help, goal orientation, and social efficacy have been examined in the context of social adaptive help seeking, researchers have not pursued how these constructs influence computer adaptive help seeking. The three studies in this dissertation addressed both social and computer adaptive help seeking. The purpose of this dissertation was to determine if reasons for avoiding help seeking, personal goal orientation, or social efficacy predict social and computer adaptive help seeking for students enrolled in computer-based, developmental mathematics courses in community college settings.

The purpose of the first study was to determine if students differentiate among three help-seeking sources: (a) formal, (b) informal, and (c) computer. Study 1 revealed that this population considered two different sources of help: social and computer help. These results were used to formulate the following questions for Study 2 and Study 3:

1. Do reasons for avoidance of help predict social or computer adaptive help seeking?

2. Does personal goal orientation predict social or computer adaptive help seeking?

3. Does social efficacy predict social or computer adaptive help seeking?

Study 2 revealed that ability concerns negatively predict social adaptive help seeking and that mastery goal orientations positively predict both social and computer adaptive help seeking. Study 3 revealed that ability concerns negatively predict social adaptive help seeking and that mastery goal orientations and social efficacy for peers positively predict social adaptive help seeking. Additionally, ability concerns negatively predict computer adaptive help seeking, and mastery goal orientations positively predict computer adaptive help seeking.

The finding that students who adopt a mastery-goal orientation use both social and computer means to adaptive help seek was not surprising. The finding that students who have ability concerns do not tend to social adaptive help seek is also consistent with previous research. However, the most important conclusion from Study 3 is that students who have ability concerns do not computer adaptive help seek, regardless of the anonymity provided by the computer. More research is needed in this field to examine why students with ability concerns tend to avoid help seeking altogether.

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CHAPTER 1: INTRODUCTION

Community colleges provide developmental courses in reading, writing, or mathematics for students who are not prepared for college-level courses, and the number of students unprepared for college mathematics courses is evident in the increasing enrollments in developmental mathematics courses (Hall & Ponton, 2005). Since the number of developmental mathematics students is increasing, colleges in general and community colleges specifically are providing alternatives to traditional classroom instruction. One of these alternatives is computer-mediated classrooms (Perin, 2004). Although computer-mediated classrooms vary in format and learning objectives, this study examined an environment in which students work independently and at their own pace to remediate their mathematics skills, using computer software as their primary source of instruction.

Provided that these students work independently and at their own pace, they will most likely need more sophisticated self-regulatory skills than do those students in more traditional developmental classrooms. Considering developmental students typically have struggled with mathematics in the past (Kinney, 2001), most inevitably will need to seek help in this kind of learning environment (Ryan & Pintrich, 1997). Challenges can motivate students to learn, but only to a point (Newman, 1998a). If a student continues to beyond that point, further independent work leads to persisting unsuccessfully, seeking assistance, or giving up (Newman, 1998a). Therefore, learning effective help seeking skills is a necessary self-regulation skill for the success of independent learners and needs additional attention in researching effective independent learning environments.

Statement of the Problem

The purpose of this dissertation was to determine if reasons for avoiding help seeking, personal goal orientation, or social efficacy predict social and computer adaptive help seeking for students enrolled in computer-based, developmental mathematics courses in community college settings. In this chapter, three studies are briefly described, the research questions are introduced, and a summary of the hypotheses is provided.

Brief Overview of the Dissertation Study

Three studies were conducted in order to explore adaptive help seeking in computer-based developmental mathematics courses. The purpose of the first study was to determine if students differentiate among three help-seeking sources: (a) formal, (b) informal, and (c) computer. Most of the research has focused on social adaptive help seeking, and evidence supports that students consider formal and informal sources for help seeking (Karabenick, 2004). Examples of formal help sources include teachers and tutors. Informal sources are peers, friends, and family members. Computers as a source of help, however, have not been researched in comparison to social sources of help. Therefore, students may consider computer resources as formal or informal help seeking, or students may consider computer resources as a different kind of help compared to social sources of help. The first study confirmed the latter. Study 1 revealed that this population considered two different sources of help: social and computer help.

These results from Study 1 were used to formulate the following questions for Study 2:

1. Do reasons for avoidance of help predict social or computer adaptive help seeking?

2. Does personal goal orientation predict social or computer adaptive help seeking?
3. Does social efficacy predict social or computer adaptive help seeking?

The second study revealed that a mastery-goal orientation predicts both social and computer adaptive help seeking. Additionally, as students' ability concerns increase, their social adaptive help seeking decreases. Two limitations of Study 2 could have impacted these results and were considered in planning Study 3. First, the data collection took place at the end of the semester. Many of the students could have worked through some of their concerns about help seeking over the course of the semester, or students with ability or expedient concerns could have dropped the course. For Study 3, data collection was conducted much earlier in the semester. The researcher anticipated a higher rate of participation that better represented the population being studied. Second, the performance goal scales used in Study 2 were developed for much younger students and focused on students' comparing themselves with other students. However, this limited the definition of performance goals to exclude other outside factors, including grades. Therefore, Study 3 also included a success goal orientation scale that measured students' motivation in terms of adopting goals directly related to grades or pursuit of degrees.

After Study 1 and Study 2 were conducted, the researcher began planning Study 3. The first study revealed the dependent variables for Study 3: social adaptive help seeking and computer adaptive help seeking. The second study refined the scales measuring the independent variables (reasons for avoiding help seeking, personal goal orientation, and social efficacy) and the procedures for data collection. The results of these studies led to the following research questions for Study 3:

1. Do reasons for avoiding help seeking predict social adaptive help seeking?

2. Do reasons for avoiding help seeking predict computer adaptive help seeking?
3. Does personal goal orientation predict social adaptive help seeking?
4. Does personal goal orientation predict computer adaptive help seeking?
5. Does social efficacy predict social adaptive help seeking?
6. Does social efficacy predict computer adaptive help seeking?

Significance of the Studies

Reasons for Avoiding Help Seeking

Autonomous, ability, and expedient concerns are three reasons for avoidance of social help seeking identified in the literature (Butler 1998; Ryan, Patrick, & Shim, 2005; Ryan & Pintrich, 1997). The significance of these studies is also to examine reasons for avoiding help via the computer. Students with autonomous concerns view help seeking as a negative dependent behavior; they prefer to find the solution independently (Butler, 1998). Social adaptive help seekers are more likely to have autonomous concerns compared to ability or expedient concerns (Butler 1998; Ryan et al., 2005). In support of these finding, it was hypothesized that for developmental mathematics, students with autonomous concerns would be social adaptive help seekers. Additionally, these students, who generally ask for hints rather than the answer, probably would seek any kind of help available that would support their independence and help them answer their questions on their own. Therefore, it also was hypothesized that students with autonomous concerns would be computer adaptive help seekers.

Students with ability concerns do not ask for help because they may seem incompetent (Butler, 1998; Newman, 1990; Ryan, Pintrich, & Midgley, 2001). Since students who express ability concerns do not social adaptive help seek as often as

students with autonomous concerns (Butler, 1998; Ryan et al., 2005), it was hypothesized that students with ability concerns would not be social adaptive help seekers. However, since computer adaptive help seeking could allow some students the "freedom to fail," without a threat to their competence (Karabenick & Knapp, 1988), it was hypothesized that students with ability concerns would be computer adaptive help seekers.

Students with expedient concerns believe the help-seeking episode may take too long or the helper may be incompetent or unwilling to help (Butler, 1998; Ryan et al., 2001). These students often ask for the answer rather than hints; they are generally not concerned with explanations or understanding the solutions. Students who express expedient concerns do not social adaptive help seek as often as students with autonomous concerns (Butler, 1998; Ryan et al., 2005), and some researchers (Aleven, Stahl, Schworm, Fischer, & Wallace, 2003) have maintained that these students most likely improperly use help-seeking systems (e.g., click through the software to the answer). Thus, it was hypothesized that students with expedient concerns would not be adaptive help seekers, either through social or computer means.

Goal Orientation

Mastery, performance-approach, and performance-avoid goal orientations have been identified in the literature (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). Again, goal orientation has only been examined in the context of social help seeking, and these studies include data about students who computer help seek.

Since most mastery-oriented students focus on understanding the problem and use a variety of effective cognitive strategies (Ames & Archer, 1988; Dweck & Leggett, 1988; Meece, Blumenfeld, & Hoyle, 1988; Middleton & Midgley, 1997; Pintrich &

DeGroot, 1990; Wolters, Yu, & Pintrich, 1996), it was likely that these students would use a variety of help-seeking strategies. Therefore, it was hypothesized that students with this orientation would be both social and computer adaptive help seekers. This hypothesis is consistent with findings in other studies relating mastery goal orientation and social adaptive help seeking (Butler & Neuman, 1995; Karabenick, 2004; Linnenbrink, 2005; Newman, 1990, 1994, 1998a, 1998b; Newman & Schwager, 1995; Ryan et al., 2005; Ryan & Pintrich, 1997).

Students with a performance-approach orientation are motivated by good grades or by comparing themselves to others (Harackiewicz et al., 2002). It also was hypothesized that students with a performance-approach orientation would be both social and computer adaptive help seekers; researchers have found positive relationships between social adaptive help seeking and performance-approach goal-oriented students (Butler & Neuman, 1995; Ryan & Pintrich, 1997; Turner, Thorpe, & Meyer, 1998).

Students with an avoidance-focus performance orientation avoid looking incompetent or less able compared to others (Harackiewicz et al., 2002). Therefore, it was hypothesized that performance-avoid oriented students would not be adaptive help seekers.

A fourth goal orientation, defined by some researchers as success-goal orientation (Tuominen, Salmela-Aro, & Niemivirta, 2006), was also measured in this study. Inconsistent results for performance-approach goals could be due to the differences in how researchers perceive performance goals; some define them in terms of students' comparing themselves to others, whereas others define them in terms of students' comparing themselves to a norm-referenced definition of competence (Harackiewicz et al., 2002). The performance-goal scales are based on the former definition. It was

important to include an additional scale that measured performance goals from a success-oriented view to determine if this population is more concerned with grades and long-term degree goals versus comparing themselves with other students. Therefore, a fourth success-goal scale was used to measure these differences.

Social Efficacy

Teacher and peer social efficacy can influence social adaptive help seeking (Ryan et al., 2005). Important questions have been addressed in the literature (e.g., Aleven et al., 2003; Karabenick & Knapp, 1988; Shofield, 1995) concerning how anonymity can influence students' help-seeking strategies in computer-based environments. However, few studies have addressed social efficacy and computer help seeking, which is the significance of the studies provided in this dissertation. It was hypothesized that students with low social efficacy would not be social adaptive help seekers; yet, since seeking help through the computer does not require social skills, they would be computer adaptive help seekers.

A Description of the Dissertation Chapters

Although reasons for avoiding help, goal orientation, and social efficacy have been examined in the context of social adaptive help seeking, researchers have not pursued how these constructs influence computer adaptive help seeking. The studies in this dissertation addressed both social and computer adaptive help seeking. To properly frame the studies described in later chapters, chapter 2 provides a review of the literature. The literature review revealed that much of the research in the field of social adaptive help seeking has been examined within the context of reasons why students avoid help seeking and achievement goal theory (Butler, 2006). Therefore, the literature review

begins with a definition of social adaptive help seeking. Then, the review provides summaries of the influential studies relating social adaptive help seeking and the three variables of (a) reasons students avoid help seeking, (b) personal goal orientation, and (c) social efficacy. Additionally, the review identifies concerns with the theoretical models used to develop, apply, and research interactive learning environments (ILEs). The review concludes with an overview of the help-seeking process, a description of computer adaptive help seeking, and specific implications for researching adaptive help seeking in ILEs. Chapter 3 describes the methodology of three studies conducted by the researcher, including descriptions of the population and of the materials used by the participants in all three studies. Additionally, chapter 3 includes a description of the participants, the instruments used, and the procedures used for each of the three studies. In Chapter 4, the results of the each of the studies are reported. Lastly, chapter 5 discusses the classroom applications based on findings from the three studies and recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

Introduction

In order to properly frame the pilot studies and the dissertation study within existing literature, this review begins with the definition of social adaptive help seeking. Next, the review reports on the influential studies relating social adaptive help seeking and the three variables of (a) reasons students avoid help seeking, (b) personal goal orientation, and (c) social efficacy. Then, the review identifies concerns with the theoretical models used to develop, apply, and research ILEs. In conclusion, this review provides an overview of the help-seeking process and specific implications for researching adaptive help seeking in ILEs.

Definition of Social Adaptive Help Seeking

The first step in understanding the relationships among social adaptive help seeking, avoidance of help seeking, personal goal orientation, and social efficacy is to review the definition of adaptive help seeking. Butler (2006) reported very little systematic, theory-driven research on help seeking prior to 1980, and the research that existed considered primarily why students avoided help seeking. In 1981, Nelson-Le Gall began formulating a theoretical model of help seeking that addressed the benefits of help seeking; she refocused research on not only why students avoid help seeking, but also what makes an effective help seeker. Nelson-Le Gall's (1981, 1985) early theories of help seeking addressed the relationship between instrumental help seeking and achievement, adaptive behaviors associated with instrumental help seeking, and relationships between instrumental help seeking and age. Nelson-Le Gall (1981, 1985) defined *instrumental help seeking*, or *mastery-oriented help seeking*, as asking for help on

processes and making requests that allow the student to solve the problem or attain the goal on his or her own. In contrast, Nelson-Le Gall (1981, 1985) also described *executive help seeking,* or *dependency-oriented help seeking,* as requests that are focused on getting the answer or having the help provider solve the problem or attain the goal for the student.

Built upon her earlier work, Nelson-La Gall (1985) developed a process for help seeking: learners must (a) be aware of a need for help, (b) make a decision to seek help, (c) make distinctions among the types of help available and identify and select a potential helper, (d) solicit help using effective strategies, and (e) evaluate the help-seeking episode. Learners must attain and maintain motivation to carry out each of the steps in the help-seeking process. This motivational aspect of help seeking led Nelson-Le Gall (1985) to establish a theoretical basis for examining help seeking in the context of student motivation. She proposed that intrinsically motivated students (i.e., students concerned with learning and understanding) were more likely to demonstrate instrumental help seeking, whereas extrinsically motivated students (i.e., students concerned with grades, competition, and evaluation by others) were more likely to practice executive help seeking.

In 1990, Newman expanded Nelson-Le Gall's model by integrating self-regulation theory, and he introduced the concept of *adaptive help seeking*.

> Self-regulated learners do not simply possess a bag of tricks or techniques to help them learn. They typically do have the requisite cognitive strategies and behavioral routines to deal with academic problems, but, more important, they also have the will and the means to deal with situations in which skills and knowledge are absent. They possess and employ an executive processing system that allows them to improvise and fall back, if necessary, to a position of dependence on others. (Evensen, Salisbury-Glennon, & Glenn, 2001, p. 32)

Both Newman (1990) and Nelson-Le Gall (1981) discussed how students depend on others and what makes an effective help seeker in the context of student motivation, and both of their models have greatly influenced help-seeking research since the 1980s. Newman's model of adaptive help seeking expanded on Nelson-Le Gall's (1981) reconceptualization of help seeking, specifically expanding on Nelson-Le Gall's instrumental help seeking. Newman's (1994) work included an emphasis on the purposefulness of help seeking and the sequence of decisions and actions that a student makes and takes. Newman (1994) examined adaptive help seeking from different perspectives—cognitive, motivational, and social-interactional. This is consistent with Zimmerman's (1986) notions that self-regulated learners are "metacognitively, motivationally, and behaviorally active participants in their own learning process" (p. 308). Newman (1994) described an example of this type of monitoring through a cognitive perspective:

> [The student] proceeds to some point at which the student monitors his or her comprehension with self-questions such as "Do I understand this?" or "Is this answer right?" (e.g., Markman, 1981). If the students' answer is "yes," he or she expresses whatever is in his or her short-term memory sort of understanding. If the student's answer is "no," a motivational-affective filter, several questions are addressed: (a) Should I proceed?, (b) How should I proceed?, (c) What should I ask, and (d) Whom Should I ask? (p. 285)

The motivational-affective filter Newman (1994) described is an important component of the model. Newman explained emotions, feeling states, and attitudes as affective factors. As described before, each step in the help seeking process requires students to use this motivational-affective filter to successfully complete each step (Newman, 1994). One of these steps involves the learner knowing whom to ask and formulating the question; this is considered the social-interactional component of the

model (Newman, 1994). Newman also considered the affective factors and the cognitive-motivational factors as part of the social-interactional process.

In summary, social adaptive help seeking is an intricate process requiring cognitive and self-regulatory abilities, along with the motivation to sustain effort and persistence that leads to the learner initiating contact with another individual to effectively communicate the need for hints, additional examples, or specific explanations. The learner then must apply the help to a specific situation and analyze the episode to determine if the help was effective; that analysis will influence future help-seeking episodes. Some researchers believe that adaptive help-seeking strategies improve as learners gain more experience and mature academically (Butler & Neuman, 1995; Nelson-Le Gall, 1985; Newman & Schwager, 1995).

Adaptive Help Seeking, Grade Level, and Age

Nelson-Le Gall (1985) asserted that maturation and experience are key predictors in a student's ability to assess a lack of understanding. Newman (1990, 1994) supported this notion that as students get older, their ability to internally monitor their comprehension is better as well as their ability to become aware of a need for help. Butler and Neuman (1995) predicted in their study of second and sixth graders (Israeli students working difficult puzzles) that goal focus would not affect lower grades as much as the higher grades. They were unable to confirm this hypothesis. Both ages were more likely to ask for instrumental help when they adopted a mastery goal orientation. In contrast, Newman and Schwager (1995) studied third- and sixth-grade math students. They reported that the sixth-grade students were much more likely to be adaptive in their help seeking (asking for hints or confirmation of the answers) compared to those in the third

grade. However, Ryan, Gheen, and Midgley (1998) found that adolescents tended to avoid help seeking even when they were aware of the need for help.

The issue of learners' adapting skills more easily as they gain more educational experiences is particularly interesting for the population in this study because the students were college age, and some were older than recent high school graduates. However, these community college students ranged in academic maturity. They might lack the more sophisticated self-regulatory skills of students entering a 4-year university. In general, the researcher assumed that the learners in this study would have the cognitive awareness of when they need help. The important question is whether they would decide to seek help when they became aware of the need, and if they did seek help, would the help be instrumental in nature (i.e., adaptive help seeking)? Now that a functional definition of social adaptive help seeking is established and a developmental perspective of adaptive help seeking considered for this population, research relating social adaptive help seeking to avoidance of help seeking, personal goal orientation, and social efficacy can be explored.

Social Adaptive Help Seeking and Avoidance of Help Seeking

Once a student is aware of the need for help, that student does not always ask for help (Ryan & Pintrich, 1997). According to Newman (1994), students often will reflect on the costs and benefits of asking for help. Ryan and Pintrich argued that when costs outweigh benefits, *avoidance of help seeking* may occur. Ryan et al. (2001) defined avoidance of help seeking as "instances when students know that they need help but do not seek it" (p. 94). The literature has identified three reasons for avoidance of help seeking: students persist independently because of (a) autonomous concerns, which is

viewing help seeking as a negative dependent behavior (Butler, 1998); (b) ability concerns, which is viewing asking for help as evidence of incompetence (Butler, 1998; Newman, 1990; Ryan et al., 2001); and (c) expedient concerns, which is knowing it will take too long to get help or perceiving the helper as incompetent or unwilling to help (Butler, 1998; Ryan et al., 2001). Despite having concerns about help seeking, some students still help seek, but the kind of help seeking varies depending on the type of concern (Butler, 1998; Ryan & Pintrich, 1997; Ryan et al., 2005).

Three studies in particular have assessed how adaptive help seeking and reasons for avoiding help are related (Butler, 1998; Ryan et al., 2005; Ryan & Pintrich, 1997). These studies support the idea that students who are adaptive help seekers often have autonomous concerns. Students want to work the problems independently and thus ask for hints, additional examples, or specific explanations rather than asking for the final answer or giving up. In Butler's (1998) study, she found that fifth- and sixth-grade math students attending Jerusalem elementary schools (N = 1,029) who avoided help for autonomous reasons were more likely to be adaptive help seekers; these students requested fewer hints on later problems compared to the number of hints requested in earlier problems, thus indicating adaptive help seeking. Ryan et al. (2005) replicated these findings with students in fifth- and sixth-grade math classes (N = 844). They asserted that students who are more likely to avoid help because of ability or expedient concerns are more likely to use maladaptive strategies for help seeking instead of adaptive help seeking. Butler (1998) also found that students who were concerned about their ability asked fewer questions compared to those students who had autonomous or expedient concerns, and students whose concerns were expedient oriented asked directly for the answer more often than students with autonomous or ability concerns. Ryan and

Pintrich's (1997) study of seventh- and eighth-grade math students ($N = 203$) also found that ability-concerned students avoided help seeking more often. Additionally, Butler (1998) found that the number of independent solutions for ability or expedient orientations did not increase for later problems, indicating that these students were not adapting their help-seeking behaviors.

In general, students who have autonomous concerns are more likely to be adaptive help seekers (Butler, 1998; Ryan et al., 2005), students who are concerned about their ability tend to avoid seeking help altogether (Newman, 1990; Ryan & Pintrich, 1997; Ryan et al., 2005), and students who are expedient oriented do not ask questions that will maximize the benefits of the help-seeking episode (Butler, 1998). Since all three of these studies have been conducted with much younger students than those in the current study, it is important to find out if similar trends exist for college-level students. Although only a few studies have considered the kinds of concerns students have and how they help seek, studies of adaptive help seeking and personal goal orientation have dominated the help-seeking research field (Butler, 2006).

Social Adaptive Help Seeking and Personal Goal Orientation

Early achievement goal theory is considered a cognitivist theory (Pintrich & Schunk, 2002). Cognitivists believe that motivation is internal to the individual and cannot be observed; however, the products of motivation (choice of task, effort, persistence, and achievement) help researchers understand student motivation (Pintrich & Schunk, 2002). Cognitive models focus motivational research on the subjective and phenomenological psychology of the individual: in these models, goals play an important role in the process of motivation and provide a reason one may engage in a particular task (Pintrich & Schunk, 2002). In other words, an individual's behavior, such as deciding to

seek help, depends on what he or she is trying to attain or avoid, or the student's goals for learning. However, more recent achievement goal theories that include socioconstructivist perspectives consider aspects of the environment as well (Hickey & McCaslin, 2001; Ryan et al., 2005; Ryan & Pintrich, 1997).

Hickey (1997) proposed "a motivation research model that incorporates selected aspects of prior individual-oriented motivation research alongside newer contextualist perspectives" (pp. 184–185). Some researchers have included the study of goal structures to include context in adaptive help-seeking research (Butler & Neuman, 1995; Karabenick, 2004; Linnenbrink, 2005; Linnenbrink & Pintrich, 2001; Ryan et al., 1998; Ryan et al., 2005; Wolters, 2004). Goal structure refers to the kind of achievement goal promoted in a learning environment (Wolters, 2004). However, in the learning environment in this study, the instructors were simply help seeking providers; they did not have much of a chance in establishing classroom learning goals. The course syllabus, software, and exams were all provided by the department. However, in help-seeking situations, instructors might have the opportunity to prescribe learning goals for students. Therefore, social efficacy, specifically social efficacy for teachers and peers, also was examined in this study to provide some understanding of the contextual environment of the students. (Social efficacy is discussed in the next section.) For the purpose of this research, traditional methods were used to study personal goal orientations.

Traditionally, achievement goal theory examines two dichotomous constructs, referred to as normative goal theory (Harackiewicz et al, 2002). Generally, researchers differentiate between intrinsic and extrinsic goal orientations; these are also referred to as learning versus performance goals (Dweck & Leggett, 1988), mastery versus performance goals (Ames, 1992), mastery versus ability goals (Butler, 1998), task versus

performance goals (Maehr & Midgley, 1991), and task-involvement versus ego-involvement goals (Nicholls, 1984). Mastery or task goals are associated with an intrinsic orientation. Intrinsically motivated students participate in learning activities that challenge them, arouse curiosity, and promote mastery. Participation is what is important, not the final outcome. For example, students are satisfied when they understand, even if it is difficult or they are not guaranteed a good grade. In this literature review, goals associated with an intrinsic orientation are referred to as *mastery goals*. Students who are extrinsically motivated, or who adopt a performance or ego-involvement goal orientation, are usually concerned with grades, rewards, performance, evaluation by others, and competition. For example, the final outcome is the most important aspect of participating in a learning task. Goals associated with an extrinsic orientation are referred to as *performance goals*.

Mastery Goal Orientation and Social Adaptive Help Seeking

Although there are slightly different approaches to describing and analyzing performance goal orientations, remarkably reliable results have precluded such differences in the study of mastery goal orientations. Studies consistently have linked mastery goal orientation to the effective use of a variety of cognitive strategies (Ames & Archer, 1988; Dweck & Leggett, 1988; Meece et al., 1988; Middleton & Midgley, 1997; Pintrich & DeGroot, 1990; Wolters et al., 1996). Intrinsically-motivated students self-monitor both cognitive and motivational aspects of learning. For example, difficult problems are viewed as challenges that can solved through adjustment in strategy. Dweck and Leggett (1988) reported that these students verbalized how their efforts led to success and how they enjoyed challenging problems. Additionally, these students developed and

employed more sophisticated strategies after experiencing failed attempts to address a particular challenge. Mastery goal orientation is important in this study because it was assumed that students would need more flexible cognitive strategies and sophisticated help-seeking strategies to be successful in the computer-based mathematics course, and the researcher hypothesized that adaptive help seekers in this study would adopt a mastery goal orientation.

Since the students in this study were often working in situations where the instructor did not direct each activity, more sophisticated self-regulatory skills were beneficial. The student had more control over the activities in terms of which activities they completed, how long they spent on each activity, and when they moved on to an assessment. This required a great deal of self-discipline. Students were faced with challenges: They were required to watch tutorials more than once, pause and rewind, and then apply the information they learn.

When students have difficulty with the course material, they will persist, seek help, or give up (Newman, 1990). All of the research studies found by this researcher supported the hypothesis that students who adopt a mastery goal orientation are more likely to persist or to be adaptive help seekers (Butler & Neuman, 1995; Karabenick, 2004; Linnenbrink, 2005; Newman, 1990, 1994, 1998a, 1998b; Newman & Schwager, 1995; Ryan, et al., 2005; Ryan & Pintrich, 1997). Most of these studies examined goal orientation and help-seeking behaviors in younger students in traditional mathematics classrooms. Most of the studies used quantitative measures for establishing goal orientations and adaptive help-seeking strategies. For example, Linnenbrink (2005) studied upper elementary level math students ($N = 237$) and reported students who strongly endorsed mastery goals were consistent adaptive help seekers. Ryan et al. (2005)

studied students in fifth- and sixth-grade math classes ($N = 844$). They found that students who avoided help seeking reported a lower mastery goal orientation compared to those students who were appropriate or adaptive help seekers. Additionally, Ryan and Pintrich (1997) and Butler (1998) reported similar results for math students in Grades 7 and 8 and Grades 5 and 6, respectively. The researcher found one study of college-level students. Karabenick (2004) studied a group of chemistry college students, finding that mastery goals lead to adaptive help seeking and higher achievement. Considering the considerable amount of consistency in the relationship between adaptive help seeking and mastery orientation, the researcher anticipated similar findings in this study.

Performance Goal Orientation and Social Adaptive Help Seeking

Studies of performance goal orientation have been less conclusive than the studies of mastery goal orientation. Inconsistent evidence and a lack of understanding of performance goals led researchers to extend performance goal theory to include approach-focus performance goals and approach-avoidance performance goals (Harackiewicz et al., 2002; Linnenbrink, 2005; Wolters, 2004). Students with an approach-focus performance orientation focus on getting good grades or doing well as compared to others, whereas students with an avoidance-focus performance orientation focus on avoiding looking incompetent or less able compared to others (Harackiewicz et al., 2002).

Supporters of the new revision of goal theory have identified three important reasons for continuing the consideration of both performance-approach goals and performance-avoid goals when studying achievement goal theory: (a) separating the issues around striving toward a goal (approach) and avoiding a goal, (b) the potential

positive influences of performance-approach goals, and (c) considering possibilities of promoting both performance-approach goals and mastery goals to optimize motivation (Harackiewicz et al., 2002). This new proposed theoretical model suggests that students who are concerned with performance goals (e.g., good grades, competing with others) may correlate positively with the use of a variety of effective cognitive strategies and achievement. For example, Linnenbrink (2005) found that a performance-approach focus in students was associated with a higher positive affect. He concluded that this may be attributed to students' gaining pleasure and enjoyment from competing with other students. Those researchers who are not in favor of promoting performance-approach goals have contended that the new model suggests that students who have a performance-approach orientation do not always demonstrate the use of more sophisticated cognitive skills. They have argued that these studies used to support the different performance goals are not generalizable to all students; rather, the studies focused on very specific populations, such as college students (Midgley, Kaplan, & Middleton, 2001). Others have argued that revisiting goal orientation theory would justify the focus of performance goals in schools and that the evidence thus far is not powerful enough to allow for this outcome (Kaplan & Middleton, 2002; Midgley et al., 2001). Additionally, promoting performance-goal structures may benefit in some areas, such as cognitive engagement, but could detrimental to other areas, like help seeking (Linnenbrink, 2005). Therefore, from a holistic perspective, endorsement of performance-goal structures is not as beneficial as the endorsement of mastery goals (Linnenbrink, 2005).

Harackiewicz, Barron, and Elliot (1998) found inconsistencies in a literature review that examined the relationship between mastery goals and performance-approach goals; some researchers reported positive correlations, whereas others reported no

relationship. It terms of achievement, Harackiewicz et al. (2002) reviewed 14 studies of college-level students, and they found consistent results that support a positive relationship between performance-approach goals and academic performance. They concluded that this consistency may be attributed to how competence is traditionally defined and evaluated at the college level. Midgley et al. (2001) further argued that performance-approach goals may correlate with achievement, because the achievement assessments rely on multiple-choice exams and measure more superficial skills versus understanding. Moreover, they argued that these consistencies are based on superficial skills, and that supporting the benefits of performance-approach goals could undermine reform efforts focusing on true understanding. Harackiewicz et al. (2002) argued for the importance of examining other aspects of achievement behavior (i.e., not just grades), such as interest, that lead to lifelong learning. A similar argument can be made for the importance of studying help-seeking behaviors. Help seeking can lead to academic achievement, but this self-regulatory skill also could lead to other kinds of lifelong achievement. Therefore, for the purpose of this study, the researcher examined both performance-approach and performance-avoid goal orientations in relation to adaptive help seeking.

Before further discussing results of specific help-seeking studies, one caveat should be mentioned. It is difficult to review the literature on performance goal orientation when different scales and definitions have been used to assess performance goals. Harackiewicz et al. (2002) pointed out that some of the scales in previous studies have assessed only performance-approach goals, whereas other measures have assessed both performance-approach and performance-avoid goals. Harackiewicz et al. (2002) also attributed difficulties in summarizing prior research to the differences in defining

performance-approach goals. One difference is in terms of how researchers perceive performance goals. Harackiewicz et al. (2002) stated, "Some define them in terms of self-presentation (e.g., trying to look a certain way to others), whereas others focus exclusively on a norm-referenced definition of competence (e.g. trying to do well relative to others)" (p. 639) Another difference exists in the inconsistencies in the evaluation of performance-approach goals, or how students define external factors influencing their own motivation. For example, some students may be motivated by grades relative to what they believe is a good grade versus a good grade in comparison to others. This, too, may be another construct for further consideration within the context of performance-approach goals, especially when studying older students who may emphasize grades, but not in comparison to other students. Due to the complexity of performance goals and the newly proposed model for studying performance goals, it is difficult to draw conclusions about prior research.

When specifically examining help seeking and performance-oriented goals, researchers have reported more consistent results; studies have indicated a positive relation between performance-approach goals and adaptive help seeking (Butler & Neuman, 1995; Ryan & Pintrich, 1997; Turner et al., 1998). However, some research indicates negative relations between performance goals and help seeking. For example, in Karabenick's (2004) study of college chemistry students ($N = 852$), he theorized two patterns associated with help seeking in a study of college students. The first pattern, help-seeking approach, combined instrumental help-seeking goals with help obtained from formal sources, like teachers, compared to informal sources, students or peers. The second pattern, help-seeking avoidance, combined a threat posed by help seeking, intentions to avoid help seeking, and seeking expedient help to reduce one's work load.

Karabenick (2004) found that students with help-seeking approach patterns were more likely to adopt a mastery goal orientation. He also found that students with help-seeking avoidance patterns were more likely to adopt a performance-approach or performance-avoid goal orientation. Linnenbrink (2005) found that performance-approach goal orientations are unrelated to adaptive help seeking. In summary, adaptive help-seekers can be anticipated to adopt a performance-approach orientation.

Social Adaptive Help Seeking and Social Efficacy

In this study, the researcher also examined social efficacy, specifically social efficacy for teachers and peers, to provide some understanding of the contextual environment. Because students were working independently and at their own pace, the classroom environment would not be an appropriate factor to consider in relation to this particular research. However, students' social efficacy in relation to their teacher and peer was relevant. It was assumed that if students needed help and did not report high social efficacy, computer adaptive help seeking might be an appropriate alternative. It is important to note that the researcher is aware that this is only one factor in examining this learning environment, but informative research about the relationship of adaptive help seeking and social efficacy may begin to help researchers understand the independent learner's environment. Only one study by Ryan et al. (2005) has addressed social efficacy with teachers. In Ryan et al.'s study, students who reported lower self-efficacy with their teacher tended to avoid help, and those students who reported higher self-efficacy with their teacher tended to adaptive help seek. In addition to reasons for avoidance of help seeking and personal goal orientation, social efficacy with teachers and peers provides a

better understanding of adaptive help seeking in ILEs. The next section examines each of these factors more closely in the context of ILEs.

Problems Associated With the Development, Application, and Research of ILEs

In order to properly analyze help-seeking experiences in ILEs, one first must recognize different kinds of learning systems that support classrooms (Aleven et al., 2003). Different ILEs were designed with different theoretical principles in mind. Additionally, some ILE designers also considered how these theoretical principles influence a classroom environment. Fewer ILEs were evaluated with a theoretical model in mind (Aleven et al., 2003). Despite these theoretical intentions, or the lack thereof in some cases, the use of ILEs in classrooms varies considerably. For example, instructors use ILEs to supplement classrooms with whole-class instruction, activities, and discussion, or students work independently and at their own pace using the software as their primary source of instruction. In either case, or in those cases in between, it is inevitable that most students will encounter difficulties and solicit help in any environment (Ryan & Pintrich, 1997). Given these assumptions, it is important to note that there is a significant disconnect among the basis of a theoretical framework for designing ILEs, theory used to apply the use of ILEs in classrooms, and the theoretical frameworks used to research and evaluate ILEs (Hickey, 1997). In this section of the review, evidence of this disconnect is supported by four examples.

Most ILEs in schools, both in high schools and community colleges, have a behaviorist or early cognitivist focus (Hickey & McCaslin, 2001). For example, the most notable theoretical model for designing ILEs is based on Anderson's (1993) proposed atomic components of thought rational (ACT-R) theory of cognition and learning

(Aleven et al., 2003). Based in early cognitive theory, ACT-R argues that complex skills are made up of smaller components called production rules. These rules are learned through examples and become automated through practice. An example of software developed using ACT-R is the Cognitive Tutor (Alevan et al., 2003; Hickey & McCaslin, 2001). Although very little consideration for application was given to the theoretical framework for how Cognitive Tutor would be used in the classroom (Hickey & McCaslin, 2001), Koedinger and Anderson (1997) provided an example of application that supports some of the notions proposed by socioconstructivists. These include collaborative work requiring transfer of computer tools to projects, student portfolios, and journaling. The evaluation of this socioconstructivist application of Algebra Tutor, however, investigated skills acquisition but neglected to investigate the nature of the environment and possible interactions between the two factors (Koedinger & Anderson, 1997).

Another example is H. Wood and Wood's (1999) contingent tutoring model. An example of software using this model is QUADRATIC. D. Wood (2001) defined two types of contingencies: Domain contingency refers to decomposing a complex task into smaller tasks, similar to ACT-R production rules, and temporal contingency involves the tutorial decisions about if and when to intervene. H. Wood and Wood studied a small group ($N = 42$) of 14- and 15-year-olds using the software program QUADRATIC. Their study appears more experimental in nature compared to Koedinger and Anderson's (1997) research efforts. The only information about environmental context provided by the researchers was that learners used QUADRATIC in two separate tutoring sessions. The evaluation theoretical framework included environmental concerns specific to the software application (prior knowledge, help seeking, errors, speed, and learning) but

excluded any evaluation of the classroom environment or social interaction with other students and teachers. Again, H. Wood and Wood's theoretical model was associated with a cognitivist perspective. The application implications in the classroom were not explained in their research, and the evaluation considered environmental influences, but only those specifically related to the software.

A third example is Renkl's (2002) SEASITE principles that support an argument for self-explanations versus instructional explanations in computer-based help systems. Although based on some socioconstructive ideas, SEASITE principals propose certain advantages and disadvantages to student self-explanations. The advantages of self-explanations include that they are more adaptable to a student's prior knowledge, do not require the student to know when to integrate an explanation into an ongoing activity, do not allow a student to process examples passively or superficially, and are more likely to be retained (Renkl, 2002). The disadvantages are that self-explanations may not be as correct or accurate, they do not provide help when gaps in knowledge exist, and the student must be able to monitor comprehension or understanding (Renkl, 2002). Renkl did not elaborate on explanations of intent of use in the classroom, and the study was conducted under experimental conditions, not in a classroom setting. Again, the development was more in line with some socioconstructivist beliefs, whereas the evaluation was more traditional.

The last example discussed in this section is anchored instruction by the Cognitive and Technology Group at Vanderbilt (CTGV). This software was designed from a socioconstructivist perspective, using "anchored" instruction to promote problem-based learning environments. However, mixed results have been reported, primarily due to the environmental factors created by teachers. The methods for application in the classroom

were inconsistent, and in many cases, the strategies used by teachers were ones not intended by the developers (Hickey, 1997; Hickey & McClaslin, 2001).

With the disconnect of theoretical design, classroom application, and research established, this study attempted to align the three by using more traditional methods to relate adaptive help seeking with reasons for avoiding help seeking and personal goal orientation. This is consistent with the cognitivist approach to development and the minimal classroom context associated with this application. Additionally, the researcher attempted to consider a multidimensional perspective of the self by researching social efficacy. The next section provides a summary of the help-seeking process and specific implications for researching adaptive help seeking in ILEs.

Conclusion

Social adaptive help seeking is a complex process involving student motivation. Social adaptive help seekers tend to have more autonomous concerns about help seeking compared to ability or expedient concerns. Prior research has established a strong argument for the relationship between social adaptive help seeking and mastery goals. The results relating performance goals and social adaptive help seeking need additional research, but preliminary findings support the notion that social adaptive help seekers are more likely to adopt a stronger performance-approach orientation compared to a performance-avoid orientation. In terms of computer-adaptive help seeking, no prior research exists. However, knowledge about social adaptive help seeking and recent discussions for applying this knowledge to computer adaptive help seeking leads to several key issues to consider. In the last section of this review, implications for computer

adaptive help seeking are discussed in relation to self-regulation, avoidance of help seeking, personal goal orientation, and social efficacy.

Aleven et al. (2003) identified four types of ILEs that offer different kinds of help: (a) intelligent tutoring systems, (b) computer-assisted instruction, (c) educational hypermedia systems, and (d) project or problem-based learning environments. Intelligent tutoring systems (e.g., Cognitive Tutor) and computer-assisted instruction (e.g., the software used in this study) are similar in that they provide context-specific hints and feedback to students as they learn a specific cognitive skill. However, whereas computer-assisted instruction often focuses on providing feedback on the answer without individualizing help for particular students, intelligent tutoring systems rely on techniques from artificial intelligence cognitive science to individualize help as a student approaches a problem and works each step to solve the problem. Educational hypermedia systems and problem-based learning environments tend to focus on providing rich and systematic background knowledge to understand a particular domain. Educational hypermedia systems (e.g., hyperlinked textbooks) provide information to students in the form of hyperlinks that they can explore to find information. Project- or problem-based learning environments (e.g., CTGV's anchored instruction) focus on authentic learning environments to help students learn through complex problems or projects.

Each of these kinds of help has implications for computer adaptive help seeking. In general, help systems can support or hinder the self-regulatory processes associated with computer adaptive help seeking. A key issue relating self-regulation and help seeking in ILEs is computer-initiated help versus learner-initiated help. Theories consistently advocate for learner-controlled help seeking, regardless of the kind of help provided by a particular ILE, because learner-initiated help supports adaptive help

seeking. Adaptive help seekers must have the cognitive ability to have the awareness of a lack of understanding and the awareness of the necessity of asking for help (Newman, 1994). According to Nelson-Le Gall (1985), "If individuals are not aware of their own limitations or the complexity of the task at hand, then they are not likely to anticipate difficulties and take preventive action or to recover easily from difficulties encountered" (p. 71).

Ryan et al. (2001) called this stage *perplexity*, referring to "a state of puzzlement or uncertainty that arises when there is a discrepancy between personal knowledge and new information or expectations" (p. 95). These researchers further discussed how this state of perplexity can be triggered by internal (e.g., thinking of a contradicting example) and external (e.g., answer does not match the automated feedback in a computer software application) cues. As a student enters this state of perplexity, learner-initiated help systems allow the student to request help. In this research study, the questions used on the survey were preempted with statements like, "If I need help in class…." "If I have trouble doing my work…." and "If I don't understand… ." The intent was to assess learner-initiated help, although the software provides opportunities for both learner- and computer-initiated help.

With computer-initiated help systems, students may not be as conscious of when they need help, and students become accustomed to bypassing the help, even when they need it (Aleven et al., 2003). There are some issues of concern, however, in developing effective learner-initiated feedback. The computer system may not have enough information about learner's prior knowledge to offer help at the right time, and nonverbal cues are absent in this environment, making it difficult to provide the appropriate amount of help at any given time (H. Wood & Wood, 1999). Additionally, with learner-initiated

help, it is difficult to diagnose the nature of difficulty when an error is made (Anderson, 1993). In summary, learner-initiated help is more appropriate to support the use of self-regulatory skills in the help-seeking process, such as knowing when the learner needs help and reflecting and evaluating a help-seeking episode.

In a computer-based learning environment, students may experience an increased perceived anonymity, and Keefer and Karabenick (1998) suggested that this indeed may facilitate help seeking for those experiencing avoidance of help seeking. Karabenick and Knapp (1988) claimed that the freedom to fail may allow students to help seek without suffering from the negative consequences, such as believing that asking for help is evidence of incompetence. There is, however, no empirical evidence to support such a hypothesis, and a lack of social cues may make online communication more challenging than face-to-face communications, implying that help seeking might be less successful in such an environment.

As with social help seeking, studies have found that students often do not use help systems effectively and even ignore them completely (Aleven et al., 2003; Renkl, 2002; H. Wood & Wood, 1999). Students may avoid computer adaptive help seeking if the software penalizes the student for requesting help or if the software is not context specific and help seeking involves too much work (Aleven et al., 2003). Neither was the case with the software used in this study. Students may exhibit computer adaptive help seeking strategies if they express autonomous or ability concerns. If students are concerned about finding hints and explanations so they can do the work on their own, they may find computer adaptive help seeking more favorable than social help seeking. Additionally, students concerned about judgments concerning their abilities may prefer computer adaptive help seeking. Students also may exhibit maladaptive help-seeking behaviors if

they have expedient concerns; they may not properly use the help and click through the software to the answer (Aleven et al., 2003). Considering the possible relationships between computer adaptive help seeking and avoidance of help seeking, it is important to determine if autonomous and ability concerns positively relate to computer adaptive help seeking and if expedient concerns negatively relate to computer help seeking.

Students who adopt a mastery goal orientation use social adaptive help seeking strategies. It can be assumed that these students will use a variety of strategies to request help, because students with mastery goals often use more sophisticated cognitive strategies in general. Therefore, it is likely that students who adopt a mastery goal orientation also will exhibit computer adaptive help-seeking strategies. In terms of performance goals, it also may be likely that students with performance-approach goals will use computer adaptive help seeking. However, these students are driven by grades and may bypass help levels to get to the answer (Alevan et al., 2003). It was assumed in this study that students with performance-avoidance goal orientations would not adaptive help seek, either from social or computer sources.

Students who report high social efficacy tend to social adaptive help seek more often. If students are struggling with social efficacy, computer adaptive help seeking may be a viable alternative. If social concerns are a factor, computer help systems can provide assistance without the student having to interact with peers or the teacher.

Although social or computer adaptive help seeking can be exhibited by students with different views about themselves (i.e., reasons for avoidance of help), different goals for learning (i.e., personal goal orientation), and different level of comfort with social aspects of help seeking (i.e., social efficacy), adaptive help seeking in general is a self-regulatory process requiring students to maintain a level of motivation for an effective

help-seeking episode. Studies have helped researchers understand some aspects of social adaptive help seeking and identify issues related to computer adaptive help seeking. The purpose of this study was to determine reasons for avoiding help seeking, personal goal orientation, and social efficacy predicting social or computer adaptive help seeking.

CHAPTER 3: METHODS

This chapter describes the methodology of three studies conducted by the researcher. The first two studies were pilot studies. They were included in this dissertation report because the researcher believes the progression of these studies provides support for the last study, which is the dissertation study.

The purpose of the first study was to determine if students differentiate among three help-seeking sources: (a) formal, (b) informal, and (c) computer. The purpose of the second and third studies was to determine if reasons for avoiding help, personal goal orientation, or social efficacy (independent variables) predict social or computer adaptive help seeking (dependent variables). This chapter provides a description of the population and materials used by the participants in all three studies. Then, each study is explained separately, with a description of the participants, a description of the instruments used to measure each scale, and the procedures and methods used to collect and analyze data for that particular study.

Population

All three studies examined students enrolled in computer-mediated developmental mathematics courses at a local community college. Most of these students have severe deficits in mathematics, which is why they were placed in these courses to prepare for college-level mathematics courses. Participants had the choice to enroll in lecture-based courses or computer-mediated courses. High absentee rates impacted the number of students who participated in all three studies. These rates are fairly typical after the first few weeks in a developmental, computer-based mathematics course offered at this community college, and therefore a systematic bias was not predicted. It is also important

to note that some of the students had not officially dropped the course, but they were not actively participating at the time the survey was administered. Also, due to the nature of the self-paced, independent learning course and the format of the materials being available online to students, students theoretically could be active participants in the course without attending class. This could account for the high rate of absences on the day the survey was administered.

Materials

The software package provided to students was created and distributed by PLATO Learning. PLATO Learning, a commercial vendor, has offered computer-based and electronic learning instruction for over 40 years. The specific software used in all of the community colleges computer-based developmental mathematics courses is PLATO Interactive Mathematics. Interactive Mathematics is designed to serve as a supplementary package, as a complementary package, or as the primary instructional tool. Each student who used the software in the developmental mathematics courses used it as the primary instructional tool. This means that students primarily worked with the computer software independently and at their own pace. The primary role of the instructor was to provide assistance and assess student progress. Students used computers on the campus as well as personal computers at home. Each classroom included individual computers for each student to use during class time; however, 63% of the participants reported that they used the software package outside of the classroom.

The PLATO Interactive Mathematics software uses a variety of instructional strategies based on the National Council for Teachers of Mathematics standards to teach mathematical concepts, such as skill modeling and practice with feedback, collaborative

learning, mental math and estimation, problem solving, active learning with real-world scenarios, and curriculum and mathematics connections (PLATO Learning, 2004). The instructional design of the software is based on learning theory proposed by Anderson (1995). See Appendix A for a summary of PLATO design standards. Anderson and Pavlik (2003) proposed the ACT-R theory of cognition and learning. Based on early cognitive theory, ACT-R is a perspective that complex skills are made up of smaller components called production rules. These rules are learned through examples and become automated through practice. From this perspective, help seeking plays an important role in examining a specific example and learning the production rule. Consistent with Anderson's theoretical model, PLATO Interactive Mathematics provides error feedback, but most of the help is learner controlled. The learner determines when he or she needs help and what level of help is needed.

Each lesson consists of six modules designed to provide the instruction, practice, and assessments: (a) Overview, (b) Explain, (c) Apply, (d) Explore, (e) Evaluate, and (f) Homework (see Figure 1). Students may choose to computer help seek in the Explain and Apply modules.

Figure 1. Main menu for PLATO Interactive Mathematics.

The Explain module presents the mathematical content the student is learning. At any time, the student may seek on-demand help by selecting the Helpline (see Figure 2).

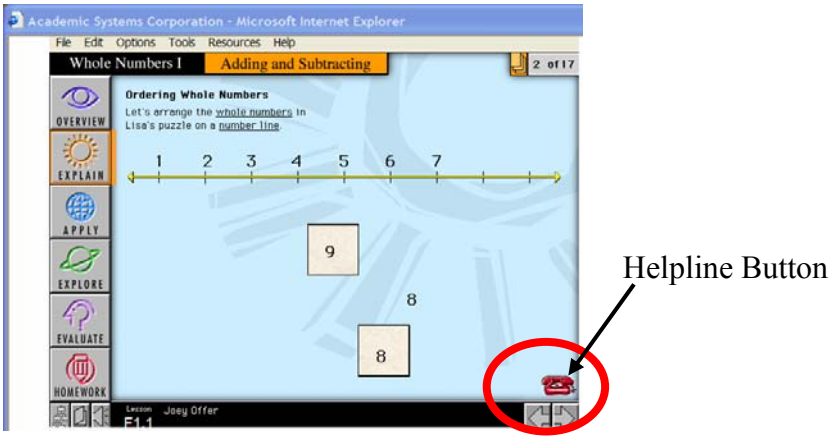

Figure 2. Helpline button display for the Explain module.

The Helpline provides different types of help from which the student may select. For example, the student can choose to see how the mathematics works, why the mathematics works, another way to approach the problem, or a picture representation of the problem (see Figure 3).

Figure 3. Different options for help.

The Apply section provides the students with opportunities to work on problems and get instant feedback (see Figure 4.) On-demand help in this module is provided by a

Link to Explain button that the student may select at any time. The student has three chances to answer a question correctly before feedback is automatically provided (see Figure 5). In summary, both the Explain and Apply modules provide students with opportunities to exhibit computer adaptive help-seeking strategies.

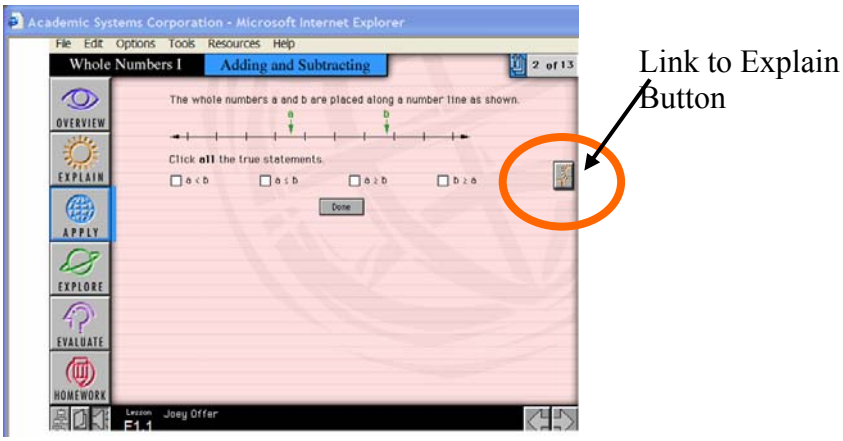

Figure 4. Sample Apply problem.

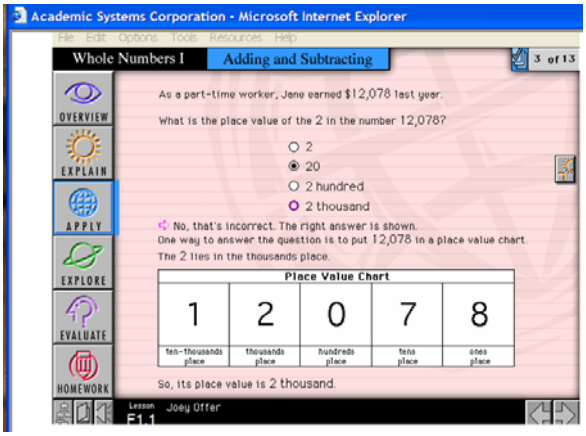

Figure 5. Feedback for a sample Apply problem.

Study 1

Study 1: Participants

Participants in Study 1 were 42 students enrolled in a computer-mediated developmental mathematics course at a local community college. Surveys were

administered in the middle of the semester. The researcher and five other community college instructors who volunteered asked their students to participate in this study; 42 out of 81 students agreed to participate. One of the instructors reported that none of her students agreed to participate; this accounts for 16 of the 39 students who did not participate. Additionally, attendance policies were not enforced by a majority of the instructors; therefore, many of the students did not participate because they were absent the day the survey was administered. This accounts for 19 of the 39 students who did not participate. Only 4 students who were present the day the instrument was administered declined participation. The students who chose to participate were asked to sign the Consent Form and to complete 10 questions about their help-seeking behaviors.

Study 1: Instruments

Ten questions were used to measure sources of help-seeking. These questions were derived from the theoretical work presented by Karabenick (2004) and Aleven, McLaren, and Koedinger (2006). For the questions within each scale, students rated themselves on a 7-point Likert scale from *not at all true of me* to *very true of me*. An individual's score for a specific scale was determined by averaging the scores for the items within the scale. Examples of questions on the survey were "I ask my teacher questions in class," "I ask friends or family members when I need help in this class," and "I use the computer resources that are part of this class when I need help in class."

Study 1: Procedures for Data Collection and Analysis

Instructors who volunteered to participate were given copies of the Consent Form and the survey instrument. They were asked to tell their students that another instructor was conducting a study about help seeking in computer-based mathematics courses. They

also told their students that their answers were confidential, and the survey results would not impact their grades. The directions on the survey read,

> The following questions ask about your motivation and attitudes about this class. There are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the question is very true of you, circle 7. If a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

Instructors then returned completed surveys to the researcher, and the researcher entered the data into an Excel spreadsheet. The Consent Forms and surveys were given to the faculty liaison at the college to be stored in a locked file cabinet. The researcher then imported the data into SPSS software and used Cronbach's alpha to determine reliability of the items. Additionally, the researcher conducted a factor analysis to determine the number of help-seeking sources considered by this population.

Study 2

Study 2: Participants

Participants in Study 2 were 86 students enrolled in a computer-mediated developmental mathematics course at a local community college. Surveys were administered the last 2 weeks of the semester. A total of 251 students were enrolled in 17 sections of the computer-based courses; 86 students participated in the study. All 17 instructors were asked to participate in the study. One instructor declined based on her beliefs about participating in survey research; this accounted for 10 of the 165 students who did not participate. One instructor never responded to the requests by e-mail and voicemail; this accounted for 13 of the 165 students who did not participate.

It is important to note that some of the students had not officially dropped the course, but they were not actively participating at the time the survey was administered.

Other students (less than 20 students) who were not actively participating completed the course early. Also, due to the nature of the self-paced, independent-learning course and the format of the materials being available online to students, students could be active participants in the course without attending class. Since 13 of the 15 participating instructors did not enforce attendance policies, only 70 students were present on the day the researcher visited the classrooms to administer the survey. Of these 70 students, 60 agreed to participate. In one class, only 2 of the 8 students agreed to participate. One reason for this low participation rate in this specific class could be that the instructor requested that students not use class time to complete the survey; if they wished to participate, they could stay after class and complete the survey. All other instructors agreed to allow students to complete the surveys during the last 15 minutes of class. The researcher left additional copies of the Consent Forms and surveys for the instructors in case additional students came to class over the following 2 weeks; 28 additional surveys were returned, but 2 of these surveys were not used because they were not complete. This increased the total sample to 86 participating students who completed surveys, consisting of the 60 students who were present the day the surveys were administered plus the additional 26 surveys collected by instructors and returned to the researcher.

The 86 participants' ages ranged from 18 to 50; the average age was 25, and the median was 21. Female students represented 60% of the participants. Ethnically, 44% of the participants were self-identified as Caucasian, 31% as Hispanic, 15% as African American, 2% as European American, and 8% as other. In terms of education, 77% of the participating students completed their high school diploma, 15% completed their GED, 5% earned associate's degrees, and 3% earned bachelor's degrees.

Study 2: Instruments

In this study, four constructs were measured: (a) adaptive help seeking, (b) reasons for avoidance of help, (c) personal goal orientation, and (d) social efficacy. Items from each scale were randomly mixed and a self-report instrument was developed. Participants responded using a 5-point Likert scale, with 1 = *not at all true,* 3 = *somewhat true,* and 5 = *very true*, which is consistent with those scales administered by Ryan et al. (2005). See Appendix B for the Motivation and Help-Seeking Survey.

Study 2: Dependent Variable: Adaptive Help Seeking

Two scales for adaptive help seeking, the dependent variable, were used in this study: social adaptive help seeking and computer adaptive help seeking. Social adaptive help seeking was assessed by Ryan et al.'s (2005) Students' Help-Seeking Measure. This scale was based on previous research on students' self-reported help seeking in academic situations (Karabenick & Knapp, 1991; Newman, 1990; Ryan & Pintrich, 1997). Ryan (2005) reported Cronbach's alpha > 0.70. Alpha values greater than 0.70 are considered acceptable reliability coefficients (Nunnaly, 1978).

Social Adaptive Help Seeking

Social adaptive help seeking requires students to effectively communicate the need for hints, additional examples, or specific explanations. The students ask questions that will help them learn, not give them the answer. The following six items were used to measure social adaptive help seeking ($\alpha > 0.70$; Ryan et al., 2005):

1. If I need help in class, I ask someone to give me hints or clues rather than the answer.
2. If I have trouble doing my work, I ask someone to give me examples of similar problems we have done.

3. If I need help with my work, I ask questions so the person will not give away the whole answer.
4. If I get stuck on a difficult problem, I ask someone for help so that I can keep working on it.
5. If I don't understand something I usually want someone to explain it to me not just give me the answer.
6. When I don't understand my work, I usually want someone to show me the steps involved in answering the questions.

Computer Adaptive Help Seeking

Computer adaptive help seeking is similar to social adaptive help in that students are still seeking hints, additional examples, or specific explanations to help them understand math, but the difference is that students are using help features in the computer software rather than approaching a person. Six items were adapted from the social adaptive help seeking items above by the researcher to measure computer adaptive help seeking. The following six items were used to measure computer adaptive help seeking:

1. If I need help in class, I use the computer software to find hints or clues rather than the answer.
2. If I have trouble doing my work, I use the computer software to find examples of similar problems we have done.
3. If I need help with my work, I use the computer software to find information that will not give away the whole answer.
4. If I get stuck on a difficult problem, I use the computer software to get help so that I can keep working on it.

5. If I don't understand something I usually want to use the computer software to find explanations rather than the answer.
6. When I don't understand my work, I usually want to use the computer software to show me the steps involved in answering the questions.

Study 2: Independent Variables

Three additional variables were used to predict adaptive help seeking. These three independent variables were (a) avoidance of help seeking, (b) personal goal orientation, and (c) social efficacy.

Avoidance of Help Seeking

Avoidance of help seeking was measured by Ryan et al.'s (2005) adapted version of Butler's (1998) "reasons for not requesting help in math class" items. The reasons were identified by three scales: (a) autonomous, (b) ability, and (c) expedient concerns. Autonomous concerns are associated with the feeling that depending on others is a negative behavior; students believe they should be able to complete their math work alone and overcome any problems by themselves. Ability concerns are linked with students' concerns about how others might view them as incompetent if they ask for help. Expedient concerns refer to students who avoid help seeking because they feel it will take too long to get appropriate help. For example, students do not want an explanation, but just the answer, or students believe the teacher is unwilling or unable (i.e., lack of competence of helper) to help them.

Autonomous concerns. The following five items were used to assess reasons for avoiding help seeking related to autonomous concerns ($\alpha = 0.86$; Ryan et al., 2005):

1. I do not ask for help when I'm having difficulty on math problems because I want to overcome the difficulty by myself.

2. I do not ask for help when I'm having difficulty on math problems because I should be able to work it out by myself.
3. I do not ask for help when I'm having difficulty on math problems because I will feel good if I work it out alone.
4. I do not ask for help when I'm having difficulty on math problems because I want to try to work out the problems by myself.
5. I do not ask for help when I'm having difficulty on math problems because I will enjoy it more if I do it alone.

Ability concerns. The following four items were used to assess reasons for avoiding help seeking related to ability concerns ($\alpha = 0.82$; Ryan et al., 2005):

1. I do not ask for help when I'm having difficulty on math problems because I don't want my friends to see that I am having difficulty.
2. I do not ask for help when I'm having difficulty on math problems because everybody else thinks the problems are easy.
3. I do not ask for help when I'm having difficulty on math problems because I don't want to look stupid in front of my teacher.
4. I do not ask for help when I'm having difficulty on math problems because I don't want to look stupid in front of other students.

Expedient concerns. The following five items were used to assess reasons for avoiding help seeking related to expedient concerns($\alpha = 0.76$; Ryan et al., 2005):

1. I do not ask for help when I'm having difficulty on math problems because my teacher probably won't tell me the answer.
2. I do not ask for help when I'm having difficulty on math problems because the explanation will take so long I won't finish.

3. I do not ask for help when I'm having difficulty on math problems because what my teacher says probably won't help me get the answer.
4. I do not ask for help when I'm having difficulty on math problems because it will take me even longer to finish.
5. I do not ask for help when I'm having difficulty on math problems because my teacher doesn't like me to ask for help.

Personal Goal Orientation

The next variable, personal goal orientation, was measured by the Patterns of Adaptive Learning Survey (PALS) developed by Midgley et al. (1996; also see Ryan et al., 2005). Three scales were used: (a) mastery goal orientation, in which students are motivated by learning and understanding math; participation is what is important, not the final outcome; (b) performance-approach goals, in which students are motivated by doing well as compared to others; and (c) performance-avoid goals, in which students are motivated by avoiding looking incompetent or less able compared to others.

Mastery goal orientation. The following six items were used to assess mastery goal orientation ($\alpha = 0.86$; Ryan et al., 2005):

1. I like math work that I'll learn from, even if I make a lot of mistakes.
2. An important reason I do my schoolwork is because I like to learn new things.
3. I like math work best when it really makes me think.
4. An important reason I do my schoolwork is because I want to improve my skills.
5. An important reason I do my schoolwork is because I am interested in it.
6. An important reason I do my schoolwork is because understanding the work we do is important to me.

Performance-approach goal orientation. The following five items were used to assess performance-approach goal orientation (α = 0.77; Ryan et al., 2005):

1. I would feel really good if I were the only one who could answer the teacher's questions in my math class.
2. An important reason I do my schoolwork is because I want to do better than other students in my class.
3. I would feel successful in math if I did better than most of the other students in class.
4. An important reason I do my schoolwork is because I'd like to show my math teacher that I'm smarter than the other students in my class.
5. Doing better than other students in math is important to me.

Performance-avoidance goal orientation. The following five items were used to assess performance-avoidance goal orientation (α = 0.78; Ryan et al., 2005):

1. An important reason I do my schoolwork is so that I won't embarrass myself.
2. An important reason I do my schoolwork is so the teacher doesn't think I know less than others.
3. An important reason I do my schoolwork is so that I don't look dumb.
4. One reason I might not participate in class is to avoid looking dumb.
5. It's very important to me that I don't look dumb in my math class.

Social Efficacy

The last variable, social efficacy, was measured by Ryan et al.'s (2005) scales. Two scales measured teacher social efficacy and peer social efficacy.

Teacher social efficacy. Teacher social efficacy was measured with the following four items (α = 0.78; Ryan et al., 2005):

1. I can explain my point of view to my teacher.
2. I find it hard to get along with my teacher (reversed).
3. If my teacher gets annoyed with me I can usually work it out.
4. I find it easy to just go and talk to my teacher.

Peer social efficacy. Peer social efficacy was measured with the following four items ($\alpha = 0.75$; Ryan et al., 2005):

1. I find it easy to start a conversation with most students in my class.
2. I can explain my point of view to other students in my class.
3. I can get along with most of the students in my class.
4. I can work well with other students in my class.

Avoidance of help seeking, personal goal orientation, and social efficacy were used in the study to predict adaptive help seeking. Other than the computer adaptive help seeking measure, these measures have been developed and tested by other researchers (Ryan et al., 2005); therefore, similar Cronbach's alphas were anticipated for this population.

Study 2: Procedures for Data Collection and Analysis

The researcher visited each participating classroom within the final 3 weeks of the Spring 2006 semester to administer the survey. The researcher explained the purpose of this research to the participants. Students then were asked if they would like to participate. The researcher gave students who agreed a Consent Form and the survey. Students completed both forms and returned them to the researcher; in general, the completion of the consent form and survey did not take longer than 15 minutes. The researcher then provided additional Consent Forms and surveys to the instructors and

asked the instructors to request participation of absent students if they attended class again before the end of the semester. After all of the surveys were returned to the researcher, either by the students attending students in class or by the instructor at the end of the semester, the research entered all data into an Excel spreadsheet. These data were then imported into SPSS.

First, the researcher analyzed the background information (age, gender, and ethnicity) of the population using descriptive statistics. Then, the researcher used Cronbach's alpha to calculate the internal reliability of each of the 10 scales: (a) social adaptive help seeking, (b) computer adaptive help seeking, (c) autonomous concerns for avoiding help seeking, (d) ability concerns for avoiding help seeking, (e) expedient concerns for avoiding help seeking, (f) mastery goals, (g) performance-approach goals, (h) performance-avoid goals, (i) teacher social efficacy, and (j) student social efficacy. Third, the researcher conducted a factor analysis for the items used to measure computer adaptive help seeking to ensure that these items produced a one-factor solution. Next, the researcher calculated correlations among all variables. Last, multiple regression analysis was chosen in order to examine the relationship between predictor variables, reasons for avoidance of help seeking and personal goal orientation, and the outcome of help seeking. A regression analysis was not used to measure the predictor variable social efficacy due to the low alphas reported in the results section. A regression analysis was chosen in order to take full advantage of the continuous scales used in data collection. Prior to data analysis, preliminary data were checked for problematic observations, such as missing values and outliers. Additionally, the researcher checked error variance and normality assumptions needed to be satisfied in order to the use the regression model. Since more than one hypothesis was evaluated in this study, and each hypothesis was

tested separately, corrections to the alpha were not needed (Perneger, 1998). The Bonferroni method is concerned with the general null hypothesis. In other words, corrections are needed if the researcher is interested in finding out if all null hypotheses are true simultaneously. This was not of interest in this study. Most statisticians agree that if a single topic or hypothesis is tested separately, then each hypothesis is treated as a mini study in the context of a larger study and should be considered on its own merits (Perneger, 1998). Therefore, four separate regressions were used to predict the effect of (a) the reasons for avoidance of help on social adaptive help seeking, (b) goal orientation on social adaptive help seeking, (c) the reasons for avoidance of help on computer adaptive help seeking, and (d) goal orientation on computer adaptive help seeking. Thus, the researcher could better understand the effect of each independent variable on each help-seeking factor.

Study 3

Study 3: Participants

Participants in the dissertation study included 152 students enrolled in a computer-mediated developmental mathematics course at a local community college. Surveys were administered in the 5th week of the fall semester 2006. A total of 259 students were enrolled in 17 sections of the computer-based courses; 157 students participated in the study, 15 students chose not to participate, and 87 students were not present the day the survey was administered. Of the 157 students who participated, only 152 surveys were complete and used in this study.

Of the 152 participants, the ages ranged from 18 to 46; the average age was 22.7, the standard deviation was 6.0, and the median was 21. Female students represented 55%

of the participants. Ethnically, 46% of the participants were self-identified as Caucasian, 32% as Hispanic, 13% as African American, 3% as European American, and 7% as other. Of the participating students, 85% completed their high school diploma, 13% completed their GED, 1% earned an associate's degree, and 1% earned a bachelor's degree.

Study 3: Instruments

The same instruments from Study 2 were used in Study 3, with one additional measure of goal orientation, which is success goal orientation. This measure is adapted from the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991). This particular measure focuses on students' perceptions that are usually concerned with grades and rewards. The final outcome is the most important aspect of participating in a learning task. The following five items were used to measure success goal orientation:

1. The most important thing for me right now is my overall success in school, so my main concern in this class is getting a good grade.
2. My main concern is getting a good grade so I can satisfy my math requirement.
3. If I can, I want to get better grades in this class than most of the other students.
4. I want to get a good grade in this class because it will help me earn my certificate or degree.
5. Getting a good grade in this class is the most satisfying thing for me right now.

Study 3: Procedures for Data Collection and Analysis

The researcher visited each participating classroom during the 5th week of the Fall 2006 semester to administer the survey. The researcher explained the purpose of this research to the participants. Students then were asked if they would like to participate. The researcher gave students who agreed a Consent Form (see Appendix C) and the Motivation and Help-Seeking Survey (see Appendix B). Students completed both forms and returned them to the researcher. In general, the completion of the consent form and survey did not take longer than 15 minutes. After all of the surveys were collected, the research entered all data into an Excel spreadsheet. These data were then imported into SPSS.

First, the researcher analyzed the background information (age, gender, and ethnicity) of the population using descriptive statistics. Then, the researcher used Cronbach's alpha to calculate the internal reliability of each scale. Given low alphas for the Social Adaptive Help Seeking scale, additional analyses, such as Cronbach's alpha with deleted items and a factor analysis, were conducted to determine if items deleted increased the internal reliability of the scale. Third, the researcher conducted a factor analysis for the items used to measure computer adaptive help seeking to ensure that these items produced a one-factor solution. Next, the researcher calculated correlations among all variables. Last, multiple regression analysis was chosen in order to examine the relationship between the outcome of help seeking and three predictor variables: (a) reasons for avoidance of help seeking, (b) personal goal orientation, and (c) social efficacy. A regression analysis was not used to measure the predictor variables of expedient concerns, success goal orientation, and teacher social efficacy due to the low alphas reported in the results section. A regression analysis was chosen in order to take

full advantage of the continuous scales used in data collection. Prior to data analysis, preliminary data were checked for problematic observations, such as missing values and outliers. Additionally, the researcher checked error variance and normality assumptions needed to be satisfied in order to use the regression model. Some concerns with the regression standardized residuals plotted against the regression standardized predicted values prompted the researcher to run additional analysis on the dependent scales. However, the skewness of the standardized residuals was less than twice the standard error of skewness, indicating acceptable levels for regression analysis.

Again, each hypothesis was tested separately, and six separate regressions were used to predict the effect of (a) the reasons for avoidance of help on social adaptive help seeking, (b) goal orientation on social adaptive help seeking, (c) social efficacy for peers on social adaptive help seeking, (d) the reasons for avoidance of help on computer adaptive help seeking, (e) goal orientation on computer adaptive help seeking, and (f) social efficacy for peers on computer adaptive help seeking. The purpose of running separate regressions was to better understand the effect of each independent variable on each help-seeking factor. The next chapter reports the results from the three studies.

CHAPTER 4: RESULTS

In chapter 3, the methods for collecting and analyzing data were presented for all three studies. In this chapter, the following results of the three studies are reported. Study 1 reports (a) the reliability of items using Cronbach's alpha and (b) the factor analysis identifying the number of help-seeking sources. Studies 2 and 3 report (a) the reliability of items using Cronbach's alpha, (b) the validity of computer adaptive help-seeking items, (c) correlations and descriptive statistics for the scales, and (d) the six regression analyses used to predict adaptive help seeking**.**

Study 1 Results

Reliability of Items and Factor Analysis

Cronbach's alpha was used to determine reliability, and a factor analysis was used to determine validity for the 10 items assessing the source of help. Students were asked if they seek help from the teacher in and out of class, from students in and out of class, friends or family members, tutors in a lab environment, or various computer resources in and out of class.

A factor analysis was used to determine how students who participated in Study 1 viewed help seeking from computers and to confirm that they viewed help seeking from formal and informal sources. The purpose of a factor analysis is to look for patterns among items. More specifically, factor analysis is used to discover if any of the items can be explained largely or even entirely in terms of each other. This allows researchers to group the items into factors (Darlington, 1997).

Since the sample size was small ($N = 42$), there were no clear solutions for the factor analysis. When a two-factor solution was forced, the social help-seeking items loaded onto one factor, and the computer help-seeking items loaded onto a second factor. See Table 1 for the factor analysis results. From these preliminary analyses, the data indicated a strong possibility of a two-factor solution with a larger sample size. This confirmed that students viewed computer help-seeking as a separate factor from social help-seeking. Additionally, the students in this study did not differentiate between formal and informal sources of help.

Table 1

Factor Analysis for Social and Computer Help-Seeking Items

	Factor	
Item no.	1. Social	2. Computer
32	.373	
33	.960	
34	.407	
35	.604	
36	.402	
37		.372
38		.673
39		.758
40		.803
41		.793

Cronbach's alpha was then used to determine the reliability of the three subscales: (a) Formal Help Seeking, (b) Informal Help Seeking, and (c) Computer Help Seeking. See Table 2 for the results. Both the Informal and Computer Help Seeking scales were reliable. However, the Cronbach's alpha for Formal Help-Seeking items was low, indicating that students did not consistently identify formal help seekers as a single

source of help. When Cronbach's alpha was calculated for the Social Help Seeking subscale, which included both formal and informal help seeking, the results were reliable.

Table 2

Cronbach's Alphas for Help-Seeking Items

Scale	No. of items	Cronbach's alpha
Formal Help Seeking	3	0.32
Informal Help Seeking	3	0.67
Social Help Seeking (both formal and informal)	6	0.64
Computer Help Seeking	4	0.84

Study 1 Results Summary

In summary, the findings indicated that students did not differentiate between formal and informal help-seeking sources. This lack of differentiation could be due to the measures used in this study. Additionally, other than Karabenick's (1998, 2002, 2004) research, most of the help-seeking research is on social help seeking, which includes both help seeking from formal and informal sources. In Study 1, students clearly identified computer help seeking as a different source of help compared to social help seeking. This identified the two dependent variables for Study 2: social adaptive help seeking and computer adaptive help seeking.

Study 2 Results

Reliability of Items Using Cronbach's Alpha

Cronbach's alpha was then used to verify the reliability of the eight subscales measuring (a) adaptive social help seeking, (b) adaptive computer help seeking, (c) autonomous concerns for avoiding help seeking, (d) ability concerns for avoiding help

seeking, (e) expedient concerns for avoiding help seeking, (f) mastery goals, (g) performance-approach goals, and (h) performance-avoid goals. See Table 3 for the results.

Table 3

Cronbach's Alphas for Each Scale, Study 2

Scale	No. of items	Cronbach's alpha
Social Adaptive Help Seeking	6	0.69
Computer Adaptive Help Seeking	6	0.87
Autonomous Concerns	5	0.84
Ability Concerns	4	0.82
Expedient Concerns	5	0.67
Master Goal Orientation	6	0.84
Performance-Approach Goal Orientation	5	0.77
Performance-Avoid Goal Orientation	5	0.75
Social Efficacy for Teachers	4	0.42
Social Efficacy for Students	4	0.63

In this sample, good internal consistency was found for all subscales (Cronbach's alpha >. 70), except for Social Adaptive Help Seeking ($\alpha = 0.69$), Expedient Concerns ($\alpha = 0.67$), Social Efficacy for Teachers ($\alpha = 0.42$), and Social Efficacy for Students ($\alpha = 0.63$). First, although the values for the Social Adaptive Help Seeking and Expedient Concerns scales were lower than 0.70, the researcher decided to include these data in the analysis since they were very close to 0.70. To be sure that one particular was not problematic, additional analyses were conducted for these two scales. See Tables 4 and 5 for results.

Table 4

Cronbach's Alphas for Items Deleted From Social Adaptive Help Seeking Scale, Study 2

Social Adaptive Help-Seeking item	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Cronbach's alpha if item deleted
1	18.26	12.515	0.442	0.646
2	17.87	13.454	0.367	0.670
3	17.97	12.905	0.457	0.642
4	17.76	13.175	0.430	0.651
5	18.27	12.904	0.427	0.651
6	18.51	12.723	0.414	0.656

Table 5

Cronbach's Alphas for Items Deleted From Expedient Concerns Scale, Study 2

Expedient Concerns item	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Cronbach's alpha if item deleted
1	5.62	4.427	0.217	0.699
2	5.23	3.286	0.462	0.605
3	5.45	3.804	0.390	0.635
4	5.29	3.032	0.599	0.527
5	5.71	4.044	0.507	0.602

The results of these analyses (see Tables 4 and 5) indicated consistency and that one particular item was not problematic. Therefore, deleting specific items would not increase the Cronbach's alpha value enough to exclude items in the final regression analysis. Additionally, the Social Efficacy scale items were too low to use these data in the final regression analysis.

Study 2 Results: Validity of Computer Adaptive Help-Seeking Items

A factor analysis was used to determine if the Adaptive Computer Help Seeking scale loaded properly, since this was the only new scale developed by the researcher. Again, the purpose of the factor analysis was to look for patterns among items. The researcher hypothesized that the computer adaptive help-seeking items could be explained largely or even entirely in terms of each other, which would allow the researcher to group the items into one factor. Data analysis confirmed this hypothesis. See Table 6 for results.

Table 6

Factor Analysis for Computer Adaptive Help-Seeking Items, Study 2

Computer Adaptive Help-Seeking item	Factor
1	0.759
2	0.818
3	0.712
4	0.772
5	0.826
6	0.773

Study 2 Results: Correlations and Descriptive Statistics for the Scales

Means, standard deviations, and correlations among student-reported measures are presented in Table 7. Only two factors, ability and expedient concerns ($r = 0.61$), correlated at a level that could be problematic for regression analysis. Performance-avoid goal orientation and ability concerns were also highly correlated ($r = 0.63$), but since four separate regression analyses were conducted, this was not problematic.

Table 7

Means, Standard Deviations, and Correlations, Study 2

	1	2	3	4	5	6	7	8
1. Social Adaptive Help Seeking	—							
2. Computer Adaptive Help Seeking	0.20	—						
3. Autonomous Concerns	-0.23*	0.16	—					
4. Ability Concerns	-0.30*	-0.04	0.36*	—				
5. Expedient Concerns	-0.19	-0.005	0.34*	0.61*	—			
6. Master Goal Orientation	0.38*	0.25*	0.11	-0.25*	-0.29*	—		
7. Performance-Approach Goal Orientation	-0.13	0.01	0.23*	0.43*	0.38*	-0.22*	—	
8. Performance-Avoid Goal Orientation	-0.19	-0.13	0.35*	0.63*	0.30*	-0.05	0.44*	—
Mean	3.62	3.23	2.33	1.54	1.37	3.73	2.19	1.96
Standard deviation	0.70	0.90	0.88	0.74	0.46	0.83	0.87	0.82

*Pearson correlation is significant at the 0.05 level.

Study 2: Results: Regression Analysis

The first regression equation was used to analyze the data relating reasons why students do not help seek and social adaptive help seeking (Equation 1):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (1)$$

where Y_1 = dependent variable of social adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of autonomous concerns
$_{x2}$ = independent variable of ability concerns

x_3 = independent variable of expedient concerns
β_1, β_2, β_3 = coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between reasons for avoiding help-seeking and social adaptive help-seeking behaviors:

$$Y_1 = 4.228 - 0.114x_1 - 0.248x_2 + 0.30x_3$$

Significant results were indicated for the overall regression model ($F_{3,82} = 3.308$, $p = 0.024$). See Table 8 for results. The multiple correlation coefficient squared, R^2, was equal to 0.108 for this model. This indicated that 10.8% of the variance was explained in social help seeking by the reasons for avoiding help predicators. This was a reasonable value for R^2 considering the study of human behavior (Keith, 2006).

Table 8

F Test for Reasons for Avoiding Help Predictors, Social Adaptive Help Seeking Scale, Study 2

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	4.477	3	1.492	3.308	0.024
Residual	36.991	82	0.451		
Total	41.468	85			

However, no significant results were indicated for the relationship between autonomous concerns and social adaptive help seeking ($t = -1.267$, $p = 0.209$), ability concerns and social adaptive help seeking ($t = -1.936$, $p = 0.056$), or expedient concerns and social adaptive help seeking ($t = 0.148$, $p = 0.883$). The significance of the results from the overall model should have been accounted for by one of these variables. Since

this was not the case, problems could be assumed due to the high correlation between ability and expedient concerns.

To address this issue, additional analyses were conducted. Three separate regressions were run to determine which factor was responsible for the overall significance of the model. However, due to the number of regressions run on the data for one hypothesis, a Bonferroni correction was used to account for Type 1 error inflation. The standard $\alpha = 0.05$ was divided by the number of times the dependent variable was tested (3). Therefore, the additional regression analysis was conducted with alpha equal to $0.01\overline{6}$. See Tables 9 and 10.

Table 9

Coefficients for Autonomous, Ability, and Expedient Concerns, Social Adaptive Help Seeking Scale, Study 2

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	4.228	0.260		16.259	0.000
Autonomous concerns	-0.114	0.090	-0.144	-1.267	0.209
Ability concerns	-0.248	0.128	-0.261	-1.936	0.056
Expedient concerns	0.030	0.202	0.020	0.148	0.883

No significant results were indicated for autonomous ($F_{1,84} = 4.743$, $p = 0.032$) or expedient concerns ($F_{1,84} = 3.112$, $p = 0.081$). However, significant results were found for ability concerns ($F_{1,84} = 8.357$, $p = 0.005$). These results indicated that ability concerns were accountable for the significance of the overall model.

Table 10

F Test for Ability Concern Predictor, Social Adaptive Help Seeking Scale, Study 2

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	3.752	1	3.752	8.357	0.005
Residual	37.716	84	0.449		
Total	41.468	85			

The second regression equation was used to analyze the data relating goal orientation and social adaptive help seeking (Equation 2):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (2)$$

where Y_1 = dependent variable of social adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of mastery goal orientation
x_2 = independent variable of performance-approach goal orientation
x_3 = independent variable of performance-avoid goal orientation
β_1, β_2, β_3 =coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made because each regression was treated as an individual test. The regression modeled the relationship between personal goal orientation and social adaptive help-seeking behaviors:

$$Y_1 = 2.647 + 0.327x_1 + 0.031x_2 - 0.160x_3$$

Significant results were indicated for the overall regression model ($F_{3,82} = 6.050$, $p = 0.0001$). See Table 11 for results. The multiple correlation coefficient squared, R^2, was equal to 0.181 for this model. This indicated that 18.1% of the variance was explained in social help seeking by the goal orientation predicators.

Table 11

F Test for Goal Orientation Predictors, Social Adaptive Help Seeking Scale, Study 2

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	7.515	3	2.505	6.050	0.001
Residual	33.953	82	0.414		
Total	41.468	85			

Significant results were indicated for the relationship between mastery goals and social adaptive help seeking ($t = 3.790$, $p = 0.000$). No significant results were indicated for the relationship between performance-approach goals ($t = 0.345$, $p = 0.731$) or performance-avoid goals ($t = –0.687$, $p = 0.095$) and social adaptive help seeking. See Table 12 for results.

Table 12

Coefficients for Mastery, Performance-Approach, and Performance-Avoid Goals, Social Adaptive Help Seeking Scale, Study 2

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	2.647	0.413		6.404	0.000
Mastery goals	0.327	0.086	0.388	3.790	0.000
Performance-approach goals	0.031	0.091	0.039	0.345	0.731
Performance-avoid goals	-0.160	0.095	-0.188	-0.687	0.095

The third regression equation was used to analyze the data relating reasons why students do not help seek and computer adaptive help seeking (Equation 3):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \qquad (3)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of autonomous concerns
$_{x2}$ = independent variable of ability concerns

x_3 = independent variable of expedient concerns
β_1, β_2, β_3 = coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made because each regression was treated as an individual test. The regression modeled the relationship between reasons for avoiding help seeking and social adaptive help-seeking behaviors:

$$Y_1 = 2.973 + 0.208x_1 - 0.135x_2 - 0.012x_3$$

No significant results were indicated for the overall regression model ($F_{3,82}$ = 1.064, *Pp* = 0.369). See Table 13 for results. Since problems with high correlations were indicated in the social help-seeking model, additional analyses were run, but no contradictory results were found.

Table 13

F Test for Reasons for Avoiding Help Predictors, Computer Adaptive Help Seeking Scale, Study 2

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	2.579	3	0.860	1.064	0.369
Residual	66.275	82	0.808		
Total	68.854	85			

The fourth regression equation was used to analyze the data relating goal orientation and computer adaptive help seeking (Equation 4):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (4)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of mastery goal orientation
$_{x2}$ = independent variable of performance-approach goal orientation
x_3 = independent variable of performance-avoid goal orientation
β_1, β_2, β_3 =coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made because each regression was treated as an individual test. The regression modeled the relationship between personal goal orientation and social adaptive help-seeking behaviors:

$$Y_1 = 2.188 + 0.297x_1 + 0.152x_2 - 0.202x_3$$

Significant results were indicated for the overall regression model ($F_{3,82} = 2.851$, $p = 0.042$). See Table 14 for results. The multiple correlation coefficient squared, R^2, was equal to 0.094 for this model. This indicated that 9.4% of the variance was explained in computer help seeking by the goal orientation predicators. This was lower than the other R^2, but again, this was an acceptable value for R^2 considering the study of human behavior (Keith, 2006).

Table 14

F Test for Goal Orientation Predictors, Computer Adaptive Help Seeking Scale, Study 2

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	6.503	3	2.168	2.851	0.042
Residual	62.352	82	0.760		
Total	68.854	85			

Significant results were indicated for the relationship between mastery goals and computer adaptive help seeking ($t = 2.547$, $p = 0.013$). No significant results were indicated for the relationship between performance-approach goals ($t = 1.231$, $p = 0.222$) or performance-avoid goals ($t = –1.574$, $p = 0.119$) and computer adaptive help seeking. See Table 15 for results.

Table 15

Coefficients for Mastery, Performance-Approach, and Performance-Avoid Goals, Computer Adaptive Help Seeking Scale, Study 2

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	2.188	0.560		3.906	0.000
Mastery goals	0.297	0.117	0.274	2.547	0.013
Performance-approach goals	0.152	0.123	0.147	1.231	0.222
Performance-avoid goals	-0.202	0.128	-0.184	-1.574	0.119

Study 2 Results: Summary

The analysis indicated that a mastery-goal orientation predicted both social and computer adaptive help seeking. Other researchers also have found that mastery goal students tend to be social adaptive help seekers (Butler & Neuman, 1995; Karabenick, 2004; Linnenbrink, 2005; Newman, 1990, 1994, 1998; Newman & Schwager, 1995; Ryan et al., 2005; Ryan & Pintrich, 1997). Additionally, analysis indicated that as students' ability concerns increased, their social adaptive help seeking decreased. This is consistent with results found by Ryan et al. (2001), Butler (1998), and Newman (1990).

Study 3 Results

Increased Number of Participants

In Study 2, the data collection took place at the end of the semester. The researcher predicted that the time of data collection could have impacted students' concerns about help seeking and could have resulted in fewer participants. However, comparing the descriptive statistics from Study 2 and Study 3 data indicated that the time

of data collection probably did not impact students' concerns about help seeking. Yet, the number of participants nearly doubled for Study 3.

Study 3 Results: Reliability of Items Using Cronbach's Alpha

Cronbach's alpha was used to verify the reliability of the subscales measuring (a) adaptive social help seeking, (b) adaptive computer help seeking, (c) autonomous concerns for avoiding help seeking, (d) ability concerns for avoiding help seeking, (e) expedient concerns for avoiding help seeking, (f) mastery goals, (g) performance-approach goals, and (h) performance-avoid goals. See Table 16 for the results.

Table 16

Cronbach's Alphas for Each Scale, Study 3

Scale	No. of items	Cronbach's alpha		
		Previous research	Pilot study	Dissertation study
Social Adaptive Help Seeking	6	$\alpha > 0.70$	0.69	0.60
Computer Adaptive Help Seeking	6	N/A	0.87	0.91
Autonomous Concerns	5	0.86	0.84	0.84
Ability Concerns	4	0.82	0.82	0.79
Expedient Concerns	5	0.76	0.67	0.57
Master Goal Orientation	6	0.86	0.84	0.84
Performance-Approach Goal Orientation	5	0.77	0.77	0.82
Performance-Avoid Goal Orientation	5	0.78	0.75	0.78
Success Goal Orientation	5	n/a	n/a	0.51
Social Efficacy for Teachers	4	0.78	0.42	0.28
Social Efficacy for Students	4	0.75	0.63	0.78

In this sample, good internal consistency was found for all subscales (Cronbach's alpha >. 70), except for Social Adaptive Help Seeking ($\alpha = 0.60$), Expedient Concerns ($\alpha = 0.57$), Success Goal Orientation ($\alpha = 0.51$), and Social Efficacy for Teachers ($\alpha = 0.28$).

First, although the value for the Social Adaptive Help Seeking scale was lower than 0.70, the researcher included these data in the analysis, because values were around 0.70 in previous studies, and removing particular items did not increase the alpha value. Additionally, although alphas greater than 0.70 are widely accepted in social science research, it is not uncommon to see acceptable alphas as lenient as 0.60 (Garson, 2007). To be sure that one particular item was not problematic for the Social Adaptive Help Seeking scale, additional analyses were conducted. See Table 17 for results.

Table 17

Cronbach's Alphas for Items Deleted From Social Adaptive Help Seeking Scale, Study 3

Social Adaptive Help Seeking item	Scale mean if item deleted	Scale variance if item deleted	Corrected item total correlation	Cronbach's alpha if item deleted
1	18.58	11.424	0.264	0.587
2	17.97	12.092	0.268	0.579
3	18.15	11.030	0.454	0.505
4	17.88	11.668	0.379	0.536
5	18.49	11.722	0.300	0.567
6	18.49	11.285	0.353	0.545

The results of this analysis (see Table 17) indicated consistency and that one particular item was not problematic. A factor analysis was also run on this scale to determine if more than one item was problematic. A two-factor solution was found. The first factor, including Items 1 and 3, produced a loading of 0.63 and higher, and the second factor, including Items 2, 4, 5, and 6, produced a loading of 0.83 or higher. However, the alpha value did not increase when Cronbach's alpha was used on each separate factor. Therefore, deleting specific items would not increase the Cronbach's alpha value, so items were not excluded in the final regression analysis.

Second, Expedient Concerns (α = 0.57), Success Goal Orientation (α = 0.51), and Social Efficacy for Teachers (α = 0.28) scales were not used in additional analysis due to low alphas. This was unfortunate, although not unexpected. In Study 2, both the alphas for the scales for Expedient Concerns and Social Efficacy for Teachers were low. In fact, the Social Efficacy for Teachers scale could not be used in additional data analysis in the pilot study either. Considering the low pilot study alphas were confirmed in this study, it is important to consider alternative scales to measure Social Efficacy for Teachers in future research. Also, Success Goal Orientation is a new scale, and so it is not surprising that adjustments need to be made for future research.

Study 3 Results: Validity of Computer Adaptive Help Seeking Items

A factor analysis was used to determine if the Adaptive Computer Help Seeking scale loaded properly, since this was the only new scale used in additional analysis that was developed by the researcher. Again, the purpose of the factor analysis was to look for patterns among items. The researcher hypothesized that the computer adaptive help-seeking items could be explained largely or even entirely in terms of each other, which would allow the researcher to group the items into one factor. Data analysis confirmed this hypothesis. See Table 18 for results.

Table 18

Factor Analysis for Computer Adaptive Help-Seeking Items, Study 3

Computer Adaptive Help Seeking item	Factor
1	0.872
2	0.868
3	0.856
4	0.851
5	0.788
6	0.783

Study 3 Results: Correlations and Descriptive Statistics for the Scales

Means, standard deviations, and correlations among student reported measures are presented in Table 19. The following two factors correlated at a level that could be problematic for regression analysis: Autonomous and Ability Concerns ($r = 0.18$) and Performance-Approach and Performance-Avoid Goal Orientations ($r = 0.51$). Other factors were also highly correlated, but since separate regression analyses were conducted, these correlations are not problematic.

Table 19

Means, Standard Deviations, and Correlations, Study 3

	1	2	3	4	5	6	7	8
1. Social Adaptive Help Seeking	—							
2. Computer Adaptive Help Seeking	0.32*	—						
3. Autonomous Concerns	-0.08	0.11	—					
4. Ability Concerns	-0.22*	-0.16	0.18*	—				
5. Master Goal Orientation	0.36*	0.25*	0.12	-0.30*	—			
6. Performance-Approach Goal Orientation	0.11	0.02	0.13	0.19*	0.14	—		
7. Performance-Avoid Goal Orientation	-0.11	-0.09	0.17*	0.59*	-0.05	0.51*	—	
8. Social Efficacy for Peers	0.28*	0.17*	0.07	-0.15	0.29*	0.41*	0.07	—
Mean	3.65	3.48	2.58	1.57	3.68	2.55	2.07	3.64
Standard deviation	0.654	1.008	0.935	0.703	0.882	1.018	0.871	0.880

*Pearson correlation is significant at the 0.05 level.

Study 3 Results: Regression Analysis

The first regression equation was used to analyze the data relating reasons why students do not help seek and social adaptive help seeking (Equation 5):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 \quad (5)$$

where Y_1 = dependent variable of social adaptive help seeking
α = intercept of the regression line

x_1 = independent variable of autonomous concerns
$_{x2}$ = independent variable of ability concerns
β_1, β_2= coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. Since more than one hypothesis was evaluated in this study, and each hypothesis was tested separately, corrections to the alpha were not needed (Perneger, 1998). The Bonferroni method is concerned with the general null hypothesis. In other words, corrections are needed if the researcher is interested in finding out all null hypotheses are true simultaneously. This was not of interest in this study. Most statisticians agree that if a single topic or hypothesis is tested separately, then each hypothesis is treated as a mini study in the context of a larger study and should be considered on its own merits (Perneger, 1998). The regression modeled the relationship between reasons for avoiding help seeking and social adaptive help-seeking behaviors:

$$Y_1 = 4.046 - 0.031x_1 - 0.200x_2$$

Significant results were indicated for the overall regression model ($F_{2,149} = 4.044$, $Pp = 0.019$). See Table 20 for results. The multiple correlation coefficient squared, R^2, was equal to 0.051 for this model, indicating that 5.1% of the variance was explained in social help seeking by the predicators of reasons for avoiding help. This was a low value for R^2, but acceptable considering the study of human behavior (Keith, 2006).

Table 20

F Test for Reasons for Avoiding Help Predictors, Social Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	3.321	2	1.661	4.044	.019
Residual	61.176	149	0.411		
Total	64.497	151			

Significant results were indicated for the relationship between ability concerns and social adaptive help seeking ($t = –2.651$, $p = 0.009$). Students who expressed ability concerns were less likely to social adaptive help seek. No significant results were indicated for the relationship between autonomous concerns ($t = –0.543$, $p = 0.588$) and social adaptive help seeking. See Table 21 for results.

Table 21

Coefficients for Autonomous and Ability Concerns, Social Adaptive Help-Seeking Scale, Study 3

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	4.046	.179		22.619	.000
Autonomous concerns	-0.031	.057	-.044	-0.543	.588
Ability concerns	-0.200	.075	-.215	-2.651	.009

The second regression equation was used to analyze the data relating goal orientation and social adaptive help seeking (Equation 6):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (6)$$

where Y_1 = dependent variable of social adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of mastery goal orientation

$_{x2}$ = independent variable of performance-approach goal orientation
x_3 = independent variable of performance-avoid goal orientation
β_1, β_2, β_3 =coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between personal goal orientation and social adaptive help-seeking behaviors:

$$Y_1 = 2.778 + 0.244x_1 + 0.096x_2 - 0.129x_3$$

Significant results were indicated for the overall regression model ($F_{3,148} = 8.901$, $p = 0.000$). See Table 22 for results. The multiple correlation coefficient squared, R^2, was equal to 0.153 for this model. This indicated that 15.3% of the variance was explained in social help seeking by the goal orientation predicators. This was an acceptable value for R^2 considering the study of human behavior (Keith, 2006).

Table 22

F Test for Goal Orientation Predictors, Social Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	9.858	3	3.286	8.901	.000
Residual	54.639	148	0.369		
Total	64.497	151			

Significant results were indicated for the relationship between mastery goals and social adaptive help seeking ($t = 4.263$, $p = 0.000$). Students who adopted mastery goals were more likely to adaptive help seek. No significant results were indicated for the relationship between performance-approach goals ($t = 1.665$, $p = 0.098$) or performance-

avoid goals ($t = –1.033$, $p = 0.055$) and social adaptive help seeking. See Table 23 for results.

Table 23

Coefficients for Mastery, Performance-Approach, and Performance-Avoid Goals, Social Adaptive Help-Seeking Scale, Study 3

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	2.778	.250		11.117	.000
Mastery goals	0.244	.057	.329	4.263	.000
Performance-approach goals	0.096	.058	.149	1.665	.098
Performance-avoid goals	-0.129	.067	-.172	-1.933	.055

The third regression equation was used to analyze the data relating reasons why students do not help seek and computer adaptive help-seeking behaviors (Equation 7):

$$Y_1 = \alpha + \beta_1 x_1 \quad (7)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of social efficacy for peers
β_1 = coefficient for the variable

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between reasons for avoiding help seeking and social adaptive help-seeking behaviors:

$$Y_1 = 3.116 + 0.147x_1$$

Significant results were indicated for the overall regression model ($F_{1,150} = 6.115$, $p = 0.015$). See Table 24 for results. The multiple correlation coefficient squared, R^2, was equal to 0.039 for this model. This indicated that 3.9% of the variance was explained in

social help seeking by the predictor of social efficacy for peers. This value was a little low for R^2 even considering the study of human behavior (Keith, 2006).

Table 24

F Test for Social Efficacy With Peers Predictors, Social Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	2.526	1	2.526	6.115	.015
Residual	61.971	150	0.413		
Total	64.497	151			

Significant results were indicated for the relationship between social efficacy with peers and social adaptive help seeking ($t = 2.473$, $p = 0.015$). See Table 25 for results.

Table 25

Coefficients for Mastery Social Efficacy With Peers, Social Adaptive Help Seeking Scale, Study 3

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	3.116	.223		13.980	.000
Social efficacy with peers	0.147	.059	.198	2.473	.015

The fourth regression equation was used to analyze the data relating reasons why students do not help seek and computer adaptive help-seeking behaviors (Equation 8):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (8)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of autonomous concerns
x_2 = independent variable of ability concerns
β_1, β_2 = coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between reasons for avoiding help seeking and social adaptive help-seeking behaviors:

$$Y_1 = 3.496 + 0.158x_1 - 0.265x_2$$

Significant results were indicated for the overall regression model ($F_{2,149} = 3.587$, $p = 0.030$). See Table 26 for results. The multiple correlation coefficient squared, R^2, was equal to 0.046 for this model. This indicated that 4.6% of the variance was explained in computer help seeking by the avoiding help seeking predicators. Again, this value was a little low (Keith, 2006).

Table 26

F Test for Reasons for Avoiding Help Predictors, Computer Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	7.054	2	3.527	3.587	.030
Residual	146.500	149	0.983		
Total	153.553	151			

Significant results were indicated for the relationship between ability concerns and computer adaptive help seeking ($t = -2.270$, $p = 0.025$). Students who expressed ability concerns were less likely to computer adaptive help seek, contradicting the hypothesis. The hypothesis was that students who expressed ability concerns would be more likely to use the computer to help seek. No significant results were indicated for the relationship between autonomous concerns and computer adaptive help seeking ($t = 1.802$, $p = 0.074$). See Table 27 for results.

Table 27

Coefficients for Mastery, Performance-Approach, and Performance-Avoid Goals, Social Adaptive Help Seeking Scale, Study 3

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	3.496	.277		12.628	.000
Autonomous concerns	0.158	.088	.147	1.802	.074
Ability concerns	-0.265	.117	-.185	-2.270	.025

The fifth regression equation was used to analyze the data relating goal orientation and computer adaptive help seeking (Equation 9):

$$Y_1 = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \quad (9)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of mastery goal orientation
$_{x2}$ = independent variable of performance-approach goal orientation
x_3 = independent variable of performance-avoid goal orientation
β_1, β_2, β_3 =coefficients for the variables

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between personal goal orientation and social adaptive help-seeking behaviors:

$$Y_1 = 2.625 + 0.273x_1 + 0.027x_2 - 0.103x_3$$

Significant results were indicated for the overall regression model ($F_{3,148} = 3.549$, $p = 0.016$). See Table 28 for results. The multiple correlation coefficient squared, R^2, was equal to 0.067 for this model, indicating that 6.7% of the variance was explained in computer help seeking by the goal orientation predicators.

Table 28

F Test for Goal Orientation Predictors, Computer Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	10.304	3	3.435	3.549	.016
Residual	143.249	148	0.968		
Total	153.553	151			

Significant results were indicated for the relationship between mastery goals and computer adaptive help seeking ($t = 2.951$, $p = 0.004$). Students who adopted mastery goals were more likely to computer adaptive help seek. No significant results were indicated for the relationship between performance-approach goals ($t = 0.295$, $p = 0.769$) or performance-avoid goals ($t = –0.951$, $p = 0.343$) and computer adaptive help seeking. See Table 29 for results.

Table 29

Coefficients for Mastery, Performance-Approach, and Performance-Avoid Goals, Computer Adaptive Help Seeking Scale, Study 3

	Unstandardized coefficients		Standardized coefficients		
Variables	*B*	Std. error	Beta	*t*	Sig.
(constant)	2.625	.405		6.488	.000
Mastery goals	0.273	.093	.239	2.951	.004
Performance-approach goals	0.027	.093	.028	0.295	.769
Performance-avoid goals	-0.103	.108	-.089	-0.951	.343

The sixth regression equation was used to analyze the data relating reasons why students do not help seek and computer adaptive help seeking (Equation 10):

$$Y_1 = \alpha + \beta_1 x_1 \qquad (10)$$

where Y_1 = dependent variable of computer adaptive help seeking
α = intercept of the regression line
x_1 = independent variable of social efficacy for peers
β_1 = coefficient for the variable

The regression analysis was conducted with a standard alpha = 0.05. No corrections were made since each regression was treated as an individual test. The regression modeled the relationship between reasons for avoiding help seeking and social adaptive help-seeking behaviors:

$$Y_1 = 2.998 + 0.134x_1$$

No significant results were indicated for the overall regression model ($F_{1,150} = 2.083$, $p = 0.151$). See Table 30 for results.

Table 30

F Test for Social Efficacy With Peers Predictors, Social Adaptive Help Seeking Scale, Study 3

Model	Sum of squares	*df*	Mean square	*F*	Sig.
Regression	2.104	1	2.104	2.083	.151
Residual	151.450	150	1.010		
Total	153.553	151			

Study 3 Results: Summary

Prior research has indicated that students who are adaptive help seekers often have autonomous concerns (Butler, 1998; Ryan et al., 2005; Ryan & Pintrich, 1997), and those students who are not adaptive help seekers express expedient or ability concerns. However, neither the pilot study nor the dissertation study data supported findings for autonomous or expedient concerns. However, the data supported findings regarding ability concerns. Both the pilot and the dissertation studies supported the notion that

students who have ability concerns do not seek adaptive help from others. The finding regarding social adaptive help seeking was expected. However, it was hypothesized that students who have ability concerns would use the computer to adaptive help seek.

Both the pilot and the dissertation studies found that a mastery goal orientation predicted both social and computer adaptive help seeking. Neither study found significant results relating performance-based goals and help seeking. Additionally, the dissertation study data indicated that students with strong peer social efficacy were more likely to social adaptive help seek. See Table 31 for a complete summary of results.

Table 31

Means, Standard Deviations, and Correlations, Complete Summary

Variable	Social adaptive help seeking	Computer adaptive help seeking
Autonomous concerns	Not significant	Not significant
Ability concerns	Negatively predicts ($p = 0.009$)	Negatively predicts ($p = 0.025$)
Expedient concerns	Not tested (low alpha)	Not tested (low alpha)
Master goal orientation	Positively predicts ($p = 0.000$)	Positively predicts ($p = 0.004$)
Performance-approach goal orientation	Not significant	Not significant
Performance-avoid goal orientation	Not significant	Not significant
Success goal orientation	Not tested (low alpha)	Not tested (low alpha)
Social efficacy for teachers	Not tested (low alpha)	Not tested (low alpha)
Social efficacy for students	Positively predicts ($p = 0.015$)	Not significant

Conclusion

Autonomous, ability, and expedient concerns are three reasons for avoidance of help seeking (Butler 1998; Ryan et al., 2005; Ryan & Pintrich, 1997). Although prior research has indicated that students who are adaptive help seekers often have autonomous concerns (Butler, 1998; Ryan et al., 2005; Ryan & Pintrich, 1997), neither Study 2 nor Study 3 data supported these findings. Additionally, students who express expedient concerns do not ask questions that will maximize the benefits of the help-seeking episode (Butler, 1998). Again, neither Study 2 nor Study 3 data supported these findings. However, the data supported findings regarding ability concerns. Both Study 2 and Study 3 supported the notion that students with ability concerns negatively predict social adaptive help seeking. In other words, students who have ability concerns do not seek adaptive help from others. Although Study 2 did not find significant results predicting computer adaptive help seeking, the dissertation study data indicated that students who have ability concerns also negatively predict help seeking. This is particularly important because researchers (Alevan et al., 2003; Keefer & Karabenick, 1998) have argued that students' anonymity in computer environments allows students to overcome ability concerns and help seek. However, this study did not find this to be true.

Mastery-oriented students focus on understanding the problem and use a variety of effective cognitive strategies (Ames & Archer, 1988; Dweck & Leggett, 1988; Meece et al., 1988; Middleton & Midgley, 1997; Pintrich & DeGroot, 1990; Wolters et al., 1996). Therefore, it was not surprising that both Study 2 and Study 3 found that a mastery goal orientation predicted both social and computer adaptive help seeking. Neither study found significant results relating performance-based goals and help seeking.

Although the regression analyses were not conducted in Study 2 due to low alphas, Study 3 data allowed for analysis of peer social efficacy. The results indicated students with higher peer social efficacy were more likely to social adaptive help seek.

It is important to note three limitations of these studies identified by the researcher. First, these studies used self-report instruments, and this type of data collection does not always adequately capture the complexity of the individual. Also, the accuracy of how individuals assess their own traits is problematic. Second, these studies depended solely on quantitative analysis, while a qualitative component could have provided additional information. Specifically, interviews would have allowed the researcher to include a thick description of the student's classroom experience and observations could have supported or refuted self-reported data of actual help-seeking episodes. The last limitation noted by the researcher relates to student perspectives of the anonymity of the computer environment. Although it was assumed that students would not feel as though their computer help seeking was tracked or monitored in any way, students may have not felt this way. Additional data supporting whether or not students believed the computer adaptive help seeking episodes were anonymous would have been helpful and clarified this point of contention.

In summary, the most significant contribution of this study is that ability concerns negatively predict computer adaptive help seeking. Although it was predicted that students with ability concerns would help seek via the computer because they would not feel comfortable seeking help from other, it may not be that simple. Ability concerns may impact motivation in more complex ways. Similarly, mastery goals may be oversimplifying motivational and help-seeking theories. From a practical perspective, the results from these studies can lead researchers to examine ways in which environments

can promote mastery goals and reduce ability concerns among students. The next step in researching ways to predict help seeking should include a more complex model that must consider both the individual and the environment and how these interact. Since a more complex model needs to be used in further research, the next chapter examines how these results can influence classroom teaching and future research.

CHAPTER 5: DISCUSSION

Three results from this study impact classroom teaching. The most important result from this study is the conclusion that students who have ability concerns are less likely to help seek via the computer. Researchers who have discussed computer help seeking have emphasized how student anonymity in computer-based help seeking may compensate for such ability concerns (Alevan et al., 2003; Keefer & Karabenick, 1998). In other words, students with ability concerns may use the computer to help seek because no one knows they are asking questions or having difficulty with the material. The second result that impacts classroom teaching is that students who adopt mastery goals use a variety of sources for help seeking, which is consistent with a majority of studies. The third result that impacts classroom teaching is that students with strong peer social efficacy tend to social help seek more often. In this section, each of these results is discussed in terms of how the results can impact computer-based classroom teaching.

Ability Concerns and Classroom Applications

Computer-based classrooms offer the possibility of searching for help anonymously. Keefer and Karabenick (1998) suggested that increased perceived anonymity may facilitate help seeking for those experiencing avoidance of help seeking. Karabenick and Knapp (1988) claimed that the freedom to fail may allow students to help seek without suffering from the negative consequences, such as believing that asking for help is evidence of incompetence. There is, however, little empirical evidence to support such a hypothesis. In one study, Shofield (1995) reported that students who use computer-based help are not as concerned about the embarrassment of having to ask for help. However, this study contradicts these results in that students who reported to have

ability concerns did not computer adaptive help seek. There are two possible interventions for classroom applications based on these results: (a) providing students with opportunities to address ability concerns at the beginning of the course and (b) providing software that includes more structured help seeking for these students.

First, it may be possible to structure classroom activities to help students with ability concerns experience small successes at the beginning of the course to help them overcome their ability concerns. Most developmental mathematics courses at the community college of this study provide a chapter at the beginning of the course that reviews prerequisite knowledge and skills. Students with ability concerns may benefit from spending more time on these chapters so they can experience more positive outcomes in learning mathematics. Although it may be difficult to avoid having students with high-ability perceptions or strong prerequisite knowledge and skills become bored if more time is spent on these chapters, computer-based classrooms are ideal for providing different pacing options for individual students. Since individual students can work at their own pace, the instructor can help ability-concerned students more appropriately pace their initial work to help address ability concerns.

The second possible intervention is providing computer-based software that provides more structure. Luckin and du Boulay (1999) suggested that the control over the kind of help provided by the system may influence students with high- and low-ability perceptions. For example, in Luckin and du Boulay's study, high-ability learners performed better using computer systems that provided some suggestions but also provided the freedom for the student to make individual choices about help seeking within the environment. In contrast, other learners preformed better if they were given more guidance by the computer software system. It may be necessary to consider the

structure provided by the software when choosing systems for students with ability concerns. It is also possible for the instructor to intervene and provide more structure for students with ability concerns. However, instructors would need to identify these students early in the course and take a more active role in individualizing the computer-based environment for particular students. This researcher's experience suggests many of the instructors take a passive role in teaching the computer-based courses, but more empirical support for providing more structure for particular students may motivate instructors to take an active role in individual's experiences in computer-based environments.

Mastery Goals and Classroom Applications

The results from these studies were consistent in finding a positive relationship between mastery goals and adaptive help seeking. One classroom application that is relevant to this finding is to explore the possibilities of influencing students' individual goal orientations through classroom goal structures. Goal structures refer to the kind of achievement goal promoted in a learning environment (Wolters, 2004). Classroom resources that influence goal structures include the teacher, instructional practices, policies used in the classroom, and the school (Wolters, 2004). For computer-based classrooms, this definition also should include instructional materials, such as computer software applications, when discussing ways to promote specific goals in the classroom. Before specific recommendations are made for classroom use, several studies are briefly reviewed that support the idea that promoting mastery-goal structures influences help seeking.

Linnenbrink and Pintrich (2001) developed two hypotheses about how classroom goal structures impact the individual. First, the buffering hypothesis is that mastery goals

in classrooms buffer negative effects of personal performance goal orientations. Several studies support the buffering hypothesis. For example, Newman (1998b) created environmental goal conditions by explaining to the students why they were working particular problems. Students in the mastery goal condition were told they were working the problems to help them understand so they could apply the knowledge to other problems. Conversely, students in the performance goal condition were told they were working the problems so they could show how smart they were and to make good grades. The results indicated a positive relation between individual performance goals and help seeking under mastery goal condition, whereas there was a negative relation between individual performance goals and help seeking under the performance goal condition.

Wolters (2004) reported students with a mastery goal structure would be more likely to persist under adverse conditions while working math problems. Karabenick (2004) reported that performance-approach and performance-avoid goal structures were highly correlated, and both predicted help-seeking avoidance patterns. He also found that mastery goal structures were the strongest predictor of help-seeking approach patterns. Turner et al. (2002) studied sixth-grade math students to determine if classroom goal structure related to particular avoidance strategies used to protect self-worth. The strategies identified in the study included avoiding seeking help, resisting novel approaches to problems, and purposeful withdrawal (i.e., self-handicapping). They found that a mastery-focused classroom led to lower instances of avoidance strategies among students. In contrast to Karabenick's (2004) results, Turner et al. reported that performance goal structures did not relate to higher instances of avoidance behaviors, like help seeking.

The second hypothesis developed by Linnenbrink and Pintrich (2001) is the matching hypothesis, which promotes both mastery and performance goals in the classroom. Promoting both goals enhances individual goals because matching a student's personal goal orientation is most beneficial. There is little empirical evidence to support this hypothesis, however.

Now that current theories of goal structures in the classroom have been explained, recommendations for classroom applications can be made. Clearly, evidence in support of the buffering hypothesis warrants the promotion of mastery goals in the classroom. There are several strategies instructors can use daily to deemphasize grades and comparing students to others and to emphasize learning and understanding. Ryan et al. (2001) identified three ways through which classroom goal structures are communicated: (a) types of academic tasks, (b) how students are recognized and evaluated, and (c) how students are encouraged to do their work.

The types of academic tasks and evaluation in computer-based environments support both mastery- and performance-based goal structures. For example, in the software used by the students in this study, each lesson begins with a real-world application. This helps the students make connections between what they are learning and how it is useful in real life. This promotes understanding the material, because they may need to apply it. Additionally, the Help section provides four choices from which students choose that focus learning on understanding through different approaches. However, many software applications, including this one, provide self-check throughout the lesson, where the student enters the answer or selects the answer from several choices. The focus on the correct answer, versus the process, does emphasize performance-based goal structures. It may be helpful for instructors to include different

kinds of assessments that focus on understanding and the process students use to reach a specific solution. Additionally, instructors' daily interactions with students can influence goal structures. For example, instructors who are promoting a mastery goal orientation in their classroom should recognize students for understanding the process and encourage students to learn why the process works. One example is using review days to allow students to explain the process to the class, rewarding students for understanding and not just providing the correct answer. Another example is to encourage individuals to understand by using examples that clearly relate to their own interests, such as career goals. Specifically, if a student wants to be a nurse, using applications about rate of intravenous fluids or converting a prescription from milligrams to grams helps the student relate to the importance of understanding the material focusing on grades.

Social Peer Efficacy and Classroom Applications

Ryan and Pintrich (1997) reported that students were more likely to seek help from their peers when they perceived themselves as comfortable and skillful in relating to them. In contrast, students are less likely to ask for help when they are concerned with their social image or status among their peers. The results from these studies are consistent with Ryan and Pintrich's findings. Therefore, two applications for classroom teaching in computer-based environments may be relevant. First, although the primary instructional tool for learning in these courses is via independent study on the computer, it is still beneficial for the instructor to provide and encourage opportunities for students to work together. The software used in this course provides supplemental group activities, and although this researcher did not observe the use of these activities, it would be helpful for instructors to use them during classroom time to promote peer help seeking

among students. Additionally, many software packages provide venues for collaborative work. Instructors could use these tools for group projects or opportunities for students to seek help from their peers outside of the classroom. Many of the students who participated in this study accessed the software outside of classroom time, and additional peer support outside of the classroom could encourage more students to take advantage of this feature of the application.

Future Research

Social cognitivists, such as Bandura (1991) and Zimmerman (1986), have suggested clear distinctions between the individual and the environment. From this perspective, theory focuses on attributes of the individual and how these interact with the environmental contexts. Most of the current research methods from the social cognitivist perspective stem from the levels-of-aggregation theory (Greeno, Collins, & Resnick, 1996). This theory attempts to reconcile the competing empiricist and rationalist perspectives. According to Hickey and McClaslin (2001), levels-of-aggregation theorists examine data from behavioral, cognitive, and situational perspectives. In this section, different theoretical approaches are examined, the levels-of-aggregation theory is used to reconcile multiple perspectives, and possibilities for further research are identified.

Social Cognitivist Perspective

Behaviorist theories focus on the individual; needs and dispositions are relevant only to environmental controls. In other words, individual characteristics are not considered (Hickey & McCaslin, 2001). Behaviorists believe that motivation is not explained by thoughts and feelings, but motivation comes from environmental events, such as a response to a stimulus (Pintrich & Schunk, 2002). The cognitive perspective

also examines the individual but considers individual's thoughts, beliefs, and emotion. Cognitivists believe that motivation cannot be observed, but the products of motivation can increase understanding of student motivation. Examples of products of motivation include choice of task, effort, persistence, and achievement (Pintrich & Schunk, 2002). Situational perspectives consider the complex interactions between the individual and the environment. Examples cited by Hickey (1997) include cognitive apprenticeship (Collins, Brown, & Newman, 1989), communities of learning (Brown, 1992), intentional learning (Bereiter & Scardamalia, 1989), schools for thought (Lamon et al., 1996), anchored instruction (CTGV, 1992), and reciprocal teaching (Brown & Palinscar, 1989). Levels-of-aggregation methods are used to collect and analyze data from all of these perspectives, and social cognitivist researchers build their models on the idea of reconciliation of these multiple theoretical approaches. Now that an understanding of the social cognitive perspective has been established, the next section explores specific models that have been used in recent research.

Social cognitivists are looking at more complex models to help understand the individual. Some researchers, such as Ryan et al. (2005) and Martin (2001, 2002, 2003), have attempted to examine a multidimensional perspective of the self. Ryan et al. (2005) examined different beliefs and attitudes of the individual student, such as concerns about help seeking, goal orientation, anxiety and affect, and academic and social efficacy. Martin (2001, 2002, 2003) developed a motivation and engagement wheel as a multidimensional approach to integrating various theoretical approaches to examine the self. The wheel has four major dimensions: (a) adaptive cognitive (value of school, mastery orientation, and self-efficacy), (b) adaptive behavioral (persistence, planning, and task management), (c) maladaptive behavioral (disengagement and self-

handicapping), and (d) impeding cognitive-affective (uncertain control, failure avoidance, and anxiety). It is important to note that traditional methods of data collection, such as Likert-scale items, were used in both previous examples.

Some researchers have introduced a theoretical framework that considers how both mastery and performance-approach goals together may benefit students (Barron & Harackiewicz, 2001; Linnenbrink, 2005; Pintrich, 2000). In this case, students who benefit from personal drive and interest as well as from competition and the reward of good grades can be explained conceptually (Hickey, 1997). Four theories describe possible outcomes when students adopt multiple goals: (a) the additive goal pattern, (b) the interactive goal pattern, (c) the specialized goal pattern, and (d) the selective goal patterns (Barron & Harackiewicz, 2001; Linnenbrink, 2005). Individuals who adopt multiple goals that lead to one single educational outcome could exhibit an additive goal pattern or an interactive goal pattern. Additive goal patterns are demonstrated by individuals who benefit from adopting these goals without effects from the other goals, whereas interactive goal patterns support the theory that the goals interact or cancel. For example, Midgley et al. (2001) argued that individuals only benefit from performance-approach goals when there is a high level of mastery goals as well. A specialized goal pattern describes individuals who adopt multiple goals, but each goal leads to different educational outcomes. For example, a mastery goal orientation may lead to adaptive help seeking, but a performance-approach goal orientation may lead to higher achievement. Last, a selective goal pattern describes individuals who adopt different goals depending on a particular situation. Mastery goals may be adopted when given a complex problem in collaborative groups, but performance goals may be adopted when studying for an individual quiz.

Although these examples provide support that researchers are attempting to analyze the individual from a more complex perspective, Hickey (1997) identified two specific limitations of the social cognitive perspective of analyzing individual traits. First, these studies continue to use self-report instruments to assess these individual traits, and this type of data collection does not adequately capture the complexity of the individual. Second, the accuracy of how individuals assess their own traits is problematic. The latter was addressed by Ryan et al. (2005) when they collected data from the teachers in order to determine if students and teachers were consistent in describing individual traits. They found consistent reports between teachers and students.

For future research of help seeking in computer-mediated classrooms, researchers need to consider multidimensional models at the individual level and at the environmental level. At the environmental level, the theoretical models used to develop the software as well as the theoretical models used by the instructors who use the software must be considered. If these are not examined together, false implications about environmental factors could be made. For example, the anchored learning videos created by the CTGV had very specific goals during development that promoted a classroom culture of expert mathematical problem solvers. However, some teachers identified the primary goal of the videos to show how math is useful. In some instances, teachers used the videos as an introduction to traditional instruction to help motivate learners. Therefore, from a social cognitive perspective, researchers must consider first a multidimensional analysis of the individual, then the goals for each contributing factor of the environment, and finally the interaction between the individual and environment.

Sociocultural Perspective

Unlike the social cognitivist approach, help-seeking research has neglected the sociocultural perspective. Hickey and McCaslin (2001) proposed that researchers focus on defining *contextual motivation* through examining social and physical aspects of the environment, or the context in which motivated activity occurs.

> In these contexts, the rationalist dichotomy between an extrinsic "performance orientation" and an intrinsic "learning orientation" should break down, because "demonstrating one's competence" and "engaging in learning-oriented activities" should become synonymous. If this is true, the presumed negative motivational consequences of common educational practices such as celebrating individual excellence and providing salient extrinsic rewards—and the resulting enhancement of performance-oriented goals—should have demonstrably less negative impact on outcomes in these learning contexts. (Hickey & McCaslin, 2001, p. 39)

This perspective analyzes events from a historical view, analyzing the behaviors of the individual and how the individuals' experiences are internalized within a specific context. Since the individual and the environment are not analyzed in isolation, current social cognitive theoretical models are not appropriate. It is important to note that although this researcher is using the levels-of-aggregation theory to incorporate sociocultural ideas into existing models, some socioculturalists refute social cognitivist theories of levels of aggregation, maintaining that it is impossible to reconcile different theoretical models. Nonetheless, a new model must be used.

Hickey (1997) identified several models to be considered. Some examples include intentional learning, coregulated learning, and authentic activities. Each of these models is discussed in the following section.

First, Hickey (1997) discussed possible theories for integrating intentional learning into goal theory. For example, Bereiter and Scardamalia (1989) introduced personal knowledge-building goals, which describe the convergence and divergence of

students' personal goals, the teachers' goals, and the situational constraints of these goals. Hickey made the distinction between traditional goal theory and intentional learning:

> The essence of intentional learning is captured by the distinction between learning through problem solving and a more deliberate learning as problem solving. In the former, students are motivated by some problematic goal, and learning is incidental in the service of reaching that goal; in the latter, learning is the problem, and student activity is motivated by the goal of learning (i.e., engaged in intentional learning). (p. 185)

Second, the removal of the emphasis of self in self-regulated learning could provide a better theoretical structure for studying motivation and help seeking from a sociocultural perspective. McClaslin and Good (1996) introduced the term *coregulated learning* to emphasize relationships, social supports, opportunity, and emerging interaction of the individual and the environment.

Last, authentic environments may assist researchers in studying motivation and help seeking. However, providing the environment is not enough; teachers and students who interact in these environments create the culture in which learning does or does not take place. It is this culture that needs to be researched properly.

In light of considering these new theoretical perspectives in the study of motivation, it may be necessary to reconceptualize the ideas of help seeking from a more fundamental level. The theoretical perspective used in this research is adaptive help seeking, evolving from self-regulation theory. Although there are hints of intentional learning, coregulated learning, and authentic environments within the development of adaptive help seeking, fundamental sociocultural beliefs about knowing and learning have been lost. More specifically, the ideas have been lost of master-apprenticeship and inquiry and learning taking place only when the teacher and the environment provide scaffolding for the learner's participation. This notion of apprenticeship or quality of assistance provided by the instructor, while considering the individual and other

environmental factors, may become the focus of help-seeking research that includes a sociocultural perspective. In summary, in order to include research of motivation and help seeking from a sociocultural perspective, researchers first need to consider more advanced theoretical models about knowing and learning and then must reconceptualize the notions of help seeking in terms of the master-apprenticeship relationships and scaffolding the learning experience (not just the individual learner).

Aggregating the Theoretical Models

In conclusion, before further research is conducted in the area of motivation and help seeking, researchers should match their own personal beliefs and the beliefs of those interacting in the learning environment (e.g., software developers and instructors) about knowing and learning to a consistent theoretical model. Researchers must determine how a multidimensional approach to analyzing the individual and environmental can be accomplished. Although studying students' personal values and beliefs is important, and in the case of this study contributed to the existing research, the main limitation of this study was a lack of consideration for particular environmental influences. As stated previously, some researchers have considered classroom goals, but again, these studies primarily have relied on student self-report instruments to determine these goals. This researcher recommends a closer, more qualitative design to address the goals promoted in classrooms. It is fairly obvious from previous research that students who adopt mastery goals are more effective adaptive help seekers. Additionally, this research revealed that ability concerns can negatively predict help seeking. It is important for further research to consider how classroom goals and structures influence mastery goals and ability concerns.

Some researchers are using alternative research methods that are more typical of sociocultural researchers (Hickey, 1997; McCaslin, 1993; Pintrich & DeGroot, 1993). Hickey suggested several naturalistic methods of research that can be used for studying motivation: classroom observations (Turner, 1995), portfolio assessment (Anderman, Parecki, & Palinscar, as cited in Hickey, 1997), and interviews (McCaslin & Murdock, 1991; Newman, 1998b). Therefore, classroom observations would be useful in identifying specific strategies used by teachers to promote mastery goals and limit ability concerns among students. Additionally, action research where the teacher keep journals and reflects on their own practices would be beneficial in teasing out some of these more complex environmental issues.

When considering students' personal beliefs, researchers need to consider more sophisticated data collection and analysis to measure the interaction between individuals and their environment. If more traditional self-report measures are considered, then sophisticated statistical analysis can provide more accurate pictures of how students' attitudes and beliefs influence help seeking. Although social cognitivist researchers have attempted to measure more traits about the individual, analysis traditionally has not considered the interaction among these traits. For example, Ryan et al. (2005) used traditional methods, descriptive statistics and multivariate analysis of variance, to analyze each scale in isolation. Some researchers, such as Karabenick (2004), are beginning to explore more complex analysis, such as hierarchical linear modeling, to produce help-seeking patterns. This researcher would recommend that self-report measures not be used in isolation, but to consider interviewing students to identify additional influences on help seeking. In summary, more qualitative methods and analysis will lead researchers to a more accurate understanding of the influences on help seeking.

APPENDICES

APPENDIX A

SUMMARY OF PLATO DESIGN STANDARDS

PLATO Curricula General Design Standards

1. Organization, chunking and pacing shall be clear and understandable to the learners.
2. Internal Consistency of instructional components' content and knowledge type shall be maintained for all declarative and procedural knowledge types.
3. Learner Control type and degree shall be appropriate for the learners and the way they will use the learning activity.
4. Flexibility and modular structure shall allow learners and instructors to use the software as they want.
5. Interactivity and practice shall be frequent, of the right knowledge type, and have feedback on wrong answers which addresses the reason for the error, or explains the principles involved.
6. Teacher's Role shall be clear, and described in the instructor guide or help system).
7. Learner's Role shall be suitable for the instructional model and the classroom.

PLATO's Standards for Content/Information

1. Content shall be clearly defined.
2. Content shall be complete and accurate for the purpose and the learner.
3. Content shall be aligned to the curriculum standards in both scope and knowledge type.
4. A full range of positive and negative examples and analogies shall be included, which will be clear to the learners.
5. Layout and non-text cues shall help learners understand the content's logical structure and direct their attention.
6. Reading level shall be appropriate to the learners.
7. Graphics, visualization and multimedia shall be used in ways which are instructionally needed and relevant, and which are appealing to the intended learners.
8. Prior knowledge assumptions shall correspond to the intended learners'.
9. Frame of reference, language and examples and imagery shall be appropriate for the intended learners.
10. Adequate accessibility shall be assured through interface design and support of assistive devices.
11. Content shall be free of bias or stereotypes.

Note. From "An Overview of the Research Base of PLATO" (Technical Paper No. 12), by Plato Learning, 2004, August, Bloomington, IN: Author, pp. 98–99.

APPENDIX B

MOTIVATION AND HELP-SEEKING SURVEY

Background Information

Gender (circle one). Male Female

Enter your birthdate: ____ ____ - ____ ____ - 19____ ____

Ethnic Background (circle one).

African American | European American | Hispanic | Caucasian | Other

Circle all that apply to you:

High School Diploma | GED | Associates Degree | Bachelor's Degree

Other: _____

Circle all that you own or use frequently:

Cell Phone PDA MP3 Player Desktop Computer Laptop Computer

Internet at home Internet at work Internet - other

Other technology you use on a regular basis : _____

_____

The following questions ask about your motivation and help-seeking attitudes about this class. There are no right or wrong answers, just answer as accurately as possible.

Use the scale to answer the questions. If you think the question is very true of you, circle 5. If a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

	not at all true		***somewhat true***		***very true***
1. If I need help in class, I ask someone to give me hints or clues rather than the answer.	1	2	3	4	5
2. I do not ask for help when I'm having difficulty on math problems because the explanation will take so long I won't finish.	1	2	3	4	5
3. If I need help with my work, I ask questions so the person will not give away the whole answer.	1	2	3	4	5
4. I would feel really good if I were the only one who could answer the teacher's questions in my math class.	1	2	3	4	5
5. I do not ask for help when I'm having difficulty on math problems because I don't want my friends to see that I am having difficulty.	1	2	3	4	5
6. The most important thing for me right now is my overall success in school, so my main concern in this class is getting a good grade.	1	2	3	4	5
7. I'm certain I can master the skills taught in math this year.	1	2	3	4	5
8. My main concern is getting a good grade so I can satisfy my math requirement.	1	2	3	4	5
9. I do not ask for help when I'm having difficulty on math problems because I don't want to look stupid in front of other students.	1	2	3	4	5
10. When I don't understand my work, I usually want to use the computer software to show me the steps involved in answering the questions.	1	2	3	4	5
11. If I have trouble doing my work, I use the computer software to find examples of similar problems we have done.	1	2	3	4	5
12. If I can, I want to get better grades in this class than most of the other students.	1	2	3	4	5

	not at all true		***somewhat true***		***very true***
13. An important reason I do my schoolwork is because I want to do better than other students in my class.	1	2	3	4	5
14. I find it easy to just go and talk to my teacher.	1	2	3	4	5
15. Doing better than other students in math is important to me.	1	2	3	4	5
16. I find it hard to get along with my teacher.	1	2	3	4	5
17. I do not ask for help when I'm having difficulty on math problems because my teacher doesn't like me to ask for help.	1	2	3	4	5
18. I do not ask for help when I'm having difficulty on math problems because I will feel good if I work it out alone.	1	2	3	4	5
19. I do not ask for help when I'm having difficulty on math problems because it will take me even longer to finish.	1	2	3	4	5
20. If I don't understand something I usually want to use the computer software to find explanations rather than the answer.	1	2	3	4	5
21. When I don't understand my work, I usually want someone to show me the steps involved in answering the questions.	1	2	3	4	5
22. I do not ask for help when I'm having difficulty on math problems because I don't want to look stupid in front of my teacher.	1	2	3	4	5
23. If my teacher gets annoyed with me I can usually work it out.	1	2	3	4	5
24. I can get along with most of the students in my class.	1	2	3	4	5
25. I can do almost all the work in math if I don't give up.	1	2	3	4	5
26. An important reason I do my schoolwork is so the teacher doesn't think I know less than others.	1	2	3	4	5
27. An important reason I do my schoolwork is because I'd like to show my math teacher that I'm smarter than the other students in my class.	1	2	3	4	5

	not at all true		***somewhat true***		***very true***
28. I can explain my point of view to other students in my class.	1	2	3	4	5
29. I do not ask for help when I'm having difficulty on math problems because I should be able to work it out by myself.	1	2	3	4	5
30. I do not ask for help when I'm having difficulty on math problems because everybody else thinks the problems are easy.	1	2	3	4	5
31. If I get stuck on a difficult problem, I ask someone for help so that I can keep working on it.	1	2	3	4	5
32. If I need help with my work, I use the computer software to find information that will not give away the whole answer.	1	2	3	4	5
33. I do not ask for help when I'm having difficulty on math problems because I want to try to work out the problems by myself.	1	2	3	4	5
34. An important reason I do my schoolwork is so that I don't look dumb.	1	2	3	4	5
35. I can do even the hardest work in my math class if I try.	1	2	3	4	5
36. I find it easy to start a conversation with most students in my class.	1	2	3	4	5
37. One reason I might not participate in class is to avoid looking dumb.	1	2	3	4	5
38. An important reason I do my schoolwork is because I am interested in it.	1	2	3	4	5
39. I do not ask for help when I'm having difficulty on math problems because what my teacher says probably won't help me get the answer.	1	2	3	4	5
40. If I get stuck on a difficult problem, I use the computer software to get help so that I can keep working on it.	1	2	3	4	5
41. If I don't understand something I usually want someone to explain it to me not just give me the answer.	1	2	3	4	5

	not at all true		***somewhat true***		***very true***
42. I do not ask for help when I'm having difficulty on math problems because I want to overcome the difficulty by myself.	1	2	3	4	5
43. I like math work that I'll learn from, even if I make a lot of mistakes.	1	2	3	4	5
44. I would feel successful in math if I did better than most of the other students in class.	1	2	3	4	5
45. An important reason I do my schoolwork is because understanding the work we do is important to me.	1	2	3	4	5
46. If I have trouble doing my work, I ask someone to give me examples of similar problems we have done.	1	2	3	4	5
47. I do not ask for help when I'm having difficulty on math problems because my teacher probably won't tell me the answer.	1	2	3	4	5
48. I want to get a good grade in this class because it will help me earn my certificate or degree.	1	2	3	4	5
49. An important reason I do my schoolwork is because I want to improve my skills.	1	2	3	4	5
50. An important reason I do my schoolwork is so that I won't embarrass myself.	1	2	3	4	5
51. I can explain my point of view to my teacher.	1	2	3	4	5
52. It's very important to me that I don't look dumb in my math class.	1	2	3	4	5
53. I'm certain I can figure out how to do even the most difficult math work.	1	2	3	4	5
54. An important reason I do my schoolwork is because I like to learn new things.	1	2	3	4	5
55. I do not ask for help when I'm having difficulty on math problems because I will enjoy it more if I do it alone.	1	2	3	4	5
56. If I need help in class, I use the computer software to find hints or clues rather than the answer.	1	2	3	4	5
57. I can work well with other students in my class.	1	2	3	4	5

	not at all true		***somewhat true***		***very true***
58. Getting a good grade in this class is the most satisfying thing for me right now.	1	2	3	4	5
59. Even if the work in math is hard, I can learn it.	1	2	3	4	5
60. I like math work best when it really makes me think.	1	2	3	4	5

APPENDIX C

CONSENT FORM

Title: Help Seeking in Developmental Mathematics Courses
Conducted By:
Joey Offer of The University of Texas at Austin: C & I
Anthony Petrosino of The University of Texas at Austin: C & I

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. Your refusal will not influence current or future relationships with Austin Community College or The University of Texas at Austin.

You can stop your participation at any time. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

Purpose: The purpose of this pilot study is to investigate the motivational beliefs and help seeking attitudes and behaviors of students enrolled in developmental mathematics courses at Austin Community College. The number of students invited to participate in this study is approximately 200. The researcher will look for relationships between motivational beliefs and help seeking behaviors.

If you agree to be in this study, we will ask you to do the following things:

- You will sign the consent form.
- You will complete a survey. This survey will not affect your grade. It will take 15-20 minutes to complete the survey.

Risks and Benefits of being in the study:

- The primary risk to participants is the discomfort that can occur from answering questions on the survey. The researcher will do everything possible to make the process free of stress, to minimize this discomfort, and to put you at ease. You may decline to answer any question(s) and you can choose to stop participation at any time.
- There may be risks that are unknown at this time. If you wish to discuss the information above or any other risks you may experience, you may call one of the Principal Investigators listed on the first page of this form.
- The benefit of this study is to share a better understanding of the relationship between motivation and help seeking for students in developmental math courses.

Compensation:
There is no compensation for participating in this study.

Confidentiality and Privacy Protections:
The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

Consent forms and surveys will be stored in a locked office at Austin Community College and examined only for research purposes by the investigator and his or her associates. Analysis of the data will not affect your grade.

The records of this study will be stored securely and kept confidential. Authorized persons from Austin Community College, The University of Texas at Austin, or their respective members of the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

How can you withdraw from this research study?
You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. If you wish to stop participation in this research study for any reason or if you have any questions, you should contact: Joey Offer at[telephone number and e-mail address].

Contacts and Questions:
If you have any questions about the study please ask now. If you have questions later or want additional information, call the researchers conducting the study. Their names and phone numbers are at the top of this page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Lisa Leiden, Ph.D., Chair of The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

Statement of Consent:
I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Signature:_____ Date: _____

_____ Date: _____
Signature of Person Obtaining Consent

Signature of Investigator:_____ Date: _____

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